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## Reserved for the Whole Earth: Forms of Evidence, Ought Anxiety, and the Futures of Geographic Inquiry

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RESERVED FOR THE WHOLE EARTH: FORMS OF EVIDENCE, OUGHT ANXIETY,  
AND THE FUTURES OF GEOGRAPHIC INQUIRY

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DISSERTATION

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A dissertation submitted in partial fulfillment of the  
requirements for the degree of Doctor of Philosophy in the  
College of Arts and Sciences  
at the University of Kentucky

By  
Eric M. Robsky Huntley  
Lexington, Kentucky  
Director: Dr. Matthew W. Wilson, Professor of Geography  
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2020

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## ABSTRACT OF DISSERTATION

### RESERVED FOR THE WHOLE EARTH: FORMS OF EVIDENCE, OUGHT ANXIETY, AND THE FUTURES OF GEOGRAPHIC INQUIRY

This dissertation examines geographic forms of evidence in the practices of landscape architects and geographers. I analyze evidence not only as an epistemic phenomenon, but as an aesthetic one, as well. Convincing an audience that the world is (or should be) one way and not another requires that knowledges be stacked, extended, and stitched together in a manner admissible to an audience. In the first two chapters, I use the case of the landscape architect Ian McHarg to examine how his approach to integrating scientific knowledge---a aesthetic response to what I theorize as 'ought anxiety'---grew alongside the environmental bureaucracy in the 1960s, but fractured and collapsed in the 1980s. I examine his approach using two generative figures: the layer and the globe. In the first chapter, I examine McHarg's attempt to expand the knowledges considered salient to planning practice, represented as vertically arrayed layers. I argue that this form of holism draws a surprising line through the history of GIS that ties geospatial technology---its aspirations if not its actuality---to mid-century conservationism and the early stirrings of bureaucratic environmentalism. In the second chapter, I narrate McHarg's horizontal upscaling of ecological planning's unit areas: from physiographic regions to the globe. In the final empirical chapter, I return to the discipline of geography to argue that a particular epistemic aesthetic---the bridge---and its impracticability played central roles in the elimination of the department of geography at the University of Michigan.

KEYWORDS: history of geography, Ian McHarg, aesthetics, critical GIS, anxiety

Eric M. Robsky Huntley

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*Name of Student*

April 20, 2020

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*To Al, Deb, and Ellen Huntley: you housed, homed, nurtured, and made demands of a body incessantly before you. It was only with the benefit of your care and attention that it was able to gradually grow over thirty-one years into its more human qualities.*

## Acknowledgements

This dissertation proved to be an ill-behaved pet, prone to running loose; trusted sources tell me that most dissertations are similar. Certain scholars, cursed by seniority and forgetful of what is to learn, will tell you that works of scholarship are held together by roots set down into fertile soil of ‘the literature’ and a vigilant alertness to empirical surprises. I have come to believe that they are held together, instead, by innumerable patient humans who do the author an immense favor: making absurd the suggestion that their document belongs to them. This dissertation doesn’t belong to me. It belongs to the names listed below. Only in its assorted failures does the buck stop with me... and only sometimes.

Thanks to Matt Wilson, to whose challenges, criticism, and feedback this work is most directly indebted. He taught me that bigger questions always hide behind smaller ones. He taught me that we are responsible for the lines we draw as well as the words and worlds we write. He insisted, by example, that doing scholarship differently is an option available to those willing to cultivate, with their allies, the necessary intensities. I am now left to hope that this line is new enough.

I must also express my sincerest gratitude to a very patient doctoral committee. Matt Zook saw some of my earliest uncertain steps as a Kentucky geographer in his Digital Geographies and Society seminar. In spite of my imbalance, he signed on to help strengthen my gait, instructing me in the fine art of taking academic work both very seriously and not-so-seriously. Betsy Beymer-Farris continuously pulled me back towards the ground by asking the hardest questions: those that challenge the pernicious supposition that all research is worth the attention it demands. Jenny Rice probably does not know how marvelously full of images her writing left my typing fingers; I hope my writing makes clear the extent to which my thought has been moved by her documentation of evidence’s sensate qualities. Anna Secor is responsible for taking in a theory-skeptic and forcing an agonistic back-and-force between that skeptic and the freer-flowing realms of theory-making. This improved my skepticism; it also perforated it, giving me new homes to make in concepts.

I am indebted to Matthew Rosenblum who contributed snark, insight, and his unparalleled depth of knowledge of the absolute dustiest, unalluringest corners of the history of geographic thought. We conducted much of the archival work that led to chapter three together; it is partly thanks to his efforts that it will soon be published as a co-authored article in the *Annals of the American Association of Geographers*. I am deeply grateful for his willingness to see some of his work benefit my dissertation. I am also grateful for his persistent affirmations that our shared obsession with our discipline’s history is not only chauvinism—it is also an intellectually viable and productive avenue for sustained inquiry.

Many denizens of the Bluegrass, less directly involved in the dissertation, taught me things as well. Lauren Cagle and Shannon Bell taught me to speak of the climate and of social justice in the same breath. Rich “Dr. Alligator” Donohue taught me both web mapping and how to hold cynicism, kindly. David Nemer taught me to adore Latour less and to dance more. Daehyun Kim taught me spatial statistics, and encouraged me to find ways to speak ‘critique’ to empiricists. Rich Schein taught me how to talk about bourbon. Michael Samers

taught me Marx and, before that, provided my first entryway into the history of geographic thought. Jeremy Crampton taught me that one never need look too hard to find the OSS, and that one must not too cavalierly dismiss the Foucauldian analytic.

During my time in Lexington, I also benefitted from the generous assembling energies several collectives. First and foremost, my entering cohort, the ‘horties’. These were: Christine Woodward (roommate extraordinaire on High Street), Curtis Pomilia, Dugan Meyer, Emily Kaufman, Jess Linz, and Myung-In Ji. These souls, in possession of extraordinary patience, grappled with me and gave me a vocabulary with which to build new positions and preoccupations. Between dance parties, happy hours, crazy-legs Fridays, and porch bourbon, I found myself benefiting from the care of a community. Matt Wilson’s students (Wilsonians?) formed a supportive community of shared endeavor, particularly Amber Bosse, Jessi Breen, Ian Spangler, and Jack Swab. I was lucky enough to expend my energies alongside the Dimensions of Political Ecology working group, particularly Manon Lefevre, Nate Millington, Patrick Bigger, Hugh Deaner, Karen Stevens, Lauren Moore, Virginia Smith, Lila Wakeman, Jessa Loomis, Ruth Dike, Fuzzy Sutton, Chayya Kolavalli, Dayton Starnes, Dan Cockayne, Kenny Stancil, and Thomas Grubbs, and to have a small part in assembling incredible conferences of divergent thinkers.

At the Massachusetts Institute of Technology, I am especially indebted to Eran Ben-Joseph, Sarah Williams, and Joe Ferreira, who saw a spark of something in a critical geographer and brought me on board to make maps that matter. They were exceedingly patient as I repeatedly extended the lifespan of my writing process, and gave me countless opportunities to develop as a mapper, technologist, planner, and pedagogue. The Department of Urban Studies and Planning is full of generous spirits and good eggs: Catherine D’Ignazio, Anne Whiston Spirn, Chris Zegres, Amy Glasmeier, Ezra Haber Glenn, Yuan Lai, Mariana Arcaya, Justin Steil, Dayna Cunningham, and Gabriella Carolini, as well as Sandra Elliot and Ellen Rushman (without whom my wheels would have fallen off). Finally, I thank Chaewon Ahn and Lily Bui—may we remain autocorrelated!

One of the privileges of academic work is the plural locations of your closest collaborators. In particular, the Graphe Critical Geography Collective has been a sympathetic dwelling place for ideas well in advance of their clarification: Zulaikha Ayub, Chris Alton, Bobby Pietrusko, Alexander Arroyo, María Arquero de Alarcón, Grga Basic, and Matthew Wilson have made it so. This collective emerged out of conference sessions at the AAG on the disciplinary dispositions of geography and the design fields; many other scholars were kind enough to participate and lend their positions and perspectives. Catherine D’Ignazio, Sarah Williams, Shannon Mattern, Jill Desimini, Bill Rankin, Amy Motzny, and Robert Cabral.

I made my first steps toward academic work in 2012 at the Taubman College of Architecture and Urban Planning at the University of Michigan. While there, I benefited enormously from the persistent encouragement of two exceptionally generous faculty: María Arquero de Alarcón and David Bieri (now at Virginia Tech). María gave of her time with a generosity that I have never seen equalled. More than once she sat with me in the urban design studio well past midnight, helping me as I articulated, with difficulty, the earliest iterations of the trajectory that I carry through here. She has continued to serve as a guiding hand and a listening ear and I am indebted to her for her patience with my vacillations. “Where is the clicking?!” David—a golden-voiced empiricist with a historian’s circulatory system—took a chance on a recovering artist. He did his best, over the course of a too-short two years, to



reshape me into the historicist spatial econometrician that would result from the union of August Losch, Walter Isard, and Luc Anselin. I did not fulfill David's wishes for either my academic specialty or for my specific historical obsessions. *Mea culpa*, David and I hope that you are pleased—if not sated—by the fleeting appearances of the history of regional science in my first two chapters.

It's a cliché that teachers learn more from students than the other way around. But it is also the case that I have been formed and reformed by the energies, criticisms, and insights of those who have contributed what they could to the spaces of learning I've been privileged to construct. I have especially benefited from conversations with Dylan Halpern, Tess McCann, DeeDee Kim, Laura Krull, Max Arnell, Yael Nidam, Jay Dev, Maia Wolochem, Adrianna Boghozian, Arianna Miranda Salazar, Michael Pearce, Ben Preis, and Daniel Engelberg. All of these generous learners, in their own idiom, strive to make data matter to publics; draw maps that re-present urgent issues; and explore the proposition that reading matters, even to the technologist. Thank you.

Early drafts of chapters one and two benefited enormously from exposure to a range of engaged audiences. I presented some of the key episodes at the Princeton University College of Architecture in January 2018, where they were usefully scrutinized by Christine Boyer and Zulaikha Ayub's 'Mapping the City' seminar. These were also presented to the Social Science Librarians' Boot Camp at Tufts University in June 2018. They also formed the basis of conference papers given at the Annual Meeting of the American Association of Geographers in San Francisco and the Dimensions of Political Ecology Conference in Lexington, Kentucky. A patient group of geographers responded to an early draft of chapter three at the AAG in Washington, DC. It was subsequently improved enormously by two anonymous peer reviewers for the *Annals of the American Association of Geographers*. I am grateful to the humans that have given of their attention.

Convention demands that personal relationships come last; this is in no way reflective of their importance. Though I am inclined to think of Cambridge, Massachusetts as a place where geographers live in exile, a range of colleagues and compatriots kept me in contact with my disciplinary backbone during my time here. Jessa Loomis, Renee Tapp, and Alan Wiig were consistent sources of support. Garrett Dash Nelson has been a sympathetic and generous friend since arriving; he reminds me that historical work can be an aesthetic joy. I confess that I repeatedly neglected to share drafts with him, though he offered feedback. Laura Rapoport, Sarah Bates, Robert Cabral, Chaewon Ahn, Lily Bui, David Tisel, Bella Purdy, Hazel Lever, Tamara Knox, Jessye Waxman, Jeffrey Rosenblum, Maisy the Dog, and Martin the Parrot made the several years over which this text emerged far richer. I also thank the Tuesday evening Mettasing crew—especially Carrie Watkins, Maddie Barr, and Lucy Wolf—for letting me in, and for making me tea.

In addition to my immediate family, to whom this text is dedicated, I must thank the Mestel Fox family—Alan, Resa, Leora, Sam, Ari, Ned—for welcoming me into a new home, both figurative and literal. Many of these words first flowed from my fingers in your apartment, which served as a nourishing retreat in Summer 2018.

Finally, my sincerest and most breathless thanks are reserved for Talia 'FoxBot' Mestel Fox. Your emotional labor, expansive love, and not-my-mother-but... have taught me a new language with which to speak of (and act towards) care and co-keeping. It would furthermore be disingenuous to say that my fixation on certain types of anxiety has not been

inflected by our propensity for working through the anxious things that we feel and live. All these and more would be included in my ‘growing list of reasons.’<sup>1</sup>

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<sup>1</sup>Talia Mestel Fox, “Co-Opting Sustainabilities: The Transformative Politics of Labor and Extended Producer Responsibility Under Brazil’s National Solid Waste Policy” (Master’s Thesis, Massachusetts Institute of Technology, 2018), 3.

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## THE ARGUMENT

The text before you examines forms of evidence in the practices of landscape architects and geographers. I take the phrase ‘forms of evidence’ quite literally. This means that I analyze evidence not only as an epistemic phenomenon, but as an aesthetic one, too. If an argument, a map, or a plan is to make friends and allies, its evidence must appear just so: not too big, not too small; not too complex, not too simple. In other words, convincing an audience that the world is (or should be) one way and not another requires that knowledges be stacked, extended, and stitched together in a manner admissible to an audience. Stacked, extended, stitched. Layer, globe, bridge.

The **layer** is a form of evidence in which multiple systems are imagined inter-dependently over a bounded horizontal extent; each system, each layer, inches the model closer to completeness. With special attention to the landscape architect and ecological planner Ian McHarg (1920-2001), I place this form of evidence alongside the emergence of bureaucratic and expertise-oriented environmentalism in the United States, arguing that the layer became a widespread epistemic aesthetic with lasting effects on the governance of ecologies.

The **globe** is a form of knowledge in which all things in all places are imagined inter-relating, requiring that the horizontal extent of an inquiry be expanded: city, region, continent, globe. In my second chapter, I again analyze the work of McHarg. Here, though, I discuss his little-known later work, in which the arrival of geocomputation created the pos-

sibility of the planetary as a scale for environmental analysis and design. I also locate the globe as an epistemic aesthetic in contemporary discourse around the climate crisis and urbanization under capital, noting the divergent potentials of the ‘globe’ as a scale for thought and action.

The **bridge** is a form of knowledge in which disciplines are understood as isolated, but bridgeable by a meta-discipline able to construct means of working-between and working-across. In the third chapter, my colleague Matthew Rosenblum and I investigate the demattering and ultimate discontinuance of geography at the University of Michigan between 1975 and 1982. We argue that the closure of the department was the result of what we could call a ‘bridge failure’: that the bridge as an epistemic aesthetic became not only ineffective but detrimental to geography, and might become so again; the future of geography has much to do with the forms of evidence geographers wield in defense of themselves.

In examining these epistemic aesthetics, I give particular attention to the relationship between forms of evidence and futurity. I argue that since the ‘crisis of representation,’ geographers have been fixated on rehearsing broadly epistemic anxieties. I argue that this is, in many cases, a highly constrained analytic that precludes substantial engagement with the pragmatics of representations that also function prepositionally—many maps serve as the basis for plans. In the first two chapters, I argue that epistemic aesthetics function as rhetorical responses to what I call ‘ought’ anxiety in the work of Ian McHarg—or the anxiety that even a compelling image is inadequate to effect change. In the last, I ask after the inverse, examining the future of a particular epistemic aesthetic—the bridge—and argue for its central role in the demise of geography as an academic discipline at the University of Michigan.



## 1 INTRODUCTION: AMEND THIS WONDERFUL EARTH

### *Aesthetics and Intervention in Geographic Inquiry*

To anticipate, not the sunrise and the dawn merely, but if possible Nature herself!

—Henry David Thoreau, *Walden* (1854).

I often think about the one, conspicuous instance in which a geographer was given the opportunity to build a University in the image of the discipline. When geographer Wallace Atwood became president of Clark University in 1921, he sought to consolidate the scientific project, writ large, into his ‘Great Geographical Institute,’ terminating faculty and graduate programs along the way. The natural sciences, to Atwood, were properly geographic and to study them on the terms of other disciplines was both redundant and reductive.<sup>1</sup> On the occasion of Atwood’s inauguration, John Finlay, then Associate Editor of the *New York Times* and former president of New York University, concluded his paean to Atwood as follows: “[President Atwood and his corps of explorers and students] will be able to tell the Lord about this wonderful earth of his and perhaps tell Him how to ‘arise and amend it.’”<sup>2</sup>

At this moment, in the 1920s, geographic inquiry took on an ambitious form. Consolidation was the order of the day. At Clark, disciplines and departments were devoured and anything that could be treated spatially—which is to say, everything—was subsumed within the geographic enterprise. The practice and process of geographic knowledge production was extended to include practices from biology, from engineering, to chemistry. Atwood

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<sup>1</sup>William A. Koelsch, “Wallace Atwood’s ‘Great Geographical Institute,’” *Annals of the Association of American Geographers* 70, no. 4 (1980): 567–82, doi:10.1111/j.1467-8306.1980.tb01333.x.

<sup>2</sup>Clark University, *Inauguration of Wallace Walter Atwood as President of Clark University, February 1, 1921* (Worcester, MA: Clark University, 1921), 56, <http://archive.org/details/inaugurationofwa00clarrich>.

assembled these into a single institute through which disciplinarily plural efforts were channeled. The geomorphologist Reynaud calls the story acted out here the ‘myth of the unity of geography.’<sup>3</sup> Smith and Glick draw on this language to diagnose my discipline’s aspiration to wholeness, its tendency to imagine its remit extending until it is inclusive of all earthly knowledges.<sup>4</sup>

In this very brief retelling of Clark’s story, specifically Finlay’s glowing prospectus, I identify two threads that I will be pulling on over the course of this text. Tracing my first thread, I hear Finlay speaking in terms of ‘wonderment’: an aesthetic evaluation. How does the practice of knowing the earth become not only rigorous but also wonderful? How is geographic knowledge presented aesthetically such that it becomes not only *true* but wonderful, coherent, parsimonious?

My second thread also runs outward from Finlay’s aspiration for the geographical sciences and their practitioners: that not only will geographers speak of the world, but that they will also *amend it*; that geographers, in recounting tales of how the world is, might also propose an intervention. But proposing an intervention—to God, government, or revolutionary—is an anxious proposition. What if the evidence fails to convince? And is it the right intervention, given what we know? Following this thread into questions of futurity, I push against stories about anxieties inherited and retold after the crisis of representation. Cartesian, epistemic, and cartographic anxieties are not the operative anxieties for earthly beings in times that demand radical change. Instead, I propose that it is what I call ‘ought

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<sup>3</sup>Alain Reynaud, *La Géographie Entre Le Mythe et La Science: Essai d’epistémologie (Geography Between Myth and Science: An Essay on Epistemology)* (Reims, France: Institut de géographie, 1974).

<sup>4</sup>Neil Smith, “Academic War over the Field of Geography’: The Elimination of Geography at Harvard, 1947–1951,” *Annals of the Association of American Geographers* 77, no. 2 (1987): 155–72, doi:10.1111/j.1467-8306.1987.tb00151.x; Thomas F. Glick, “In Search of Geography,” *Isis* 74, no. 1 (1983): 92–97, <http://www.jstor.org/stable/232286>.

anxiety' (and its attendant stomachaches) to which thought should turn.

This dissertation follows these two threads to make the argument that evaluations of geographic evidence are at least partially aesthetic. I identify three epistemic aesthetics that appear in the geographic and para-geographic sciences, three forms of evidence through which disciplined information about the earth is imaginatively drawn together. These are what I will call the 'layer', the 'globe', and the 'bridge'. Claims to integrated knowledge take many forms... and I use the word 'form' advisedly.

### 1.1 THE WONDERFUL EARTH

Notions of 'unity', synthesis, and holism run through the history of geographic inquiry. From the earliest professionalizing steps taken by the discipline's proselytes in the early 20<sup>th</sup> century,<sup>5</sup> to contemporary scholars anxious about the future of the discipline,<sup>6</sup> questions of which knowledges are geographical (and by which means they should be integrated) hold our attention. I argue, though, that while there has been much effort to understand the topology of geographic knowledge—its metaphors, its concepts<sup>7</sup>—the specifically aesthetic qualities of spatial epistemology and its forms have gone relatively underscrutinized. This is especially egregious for historians of cartography; aesthetics have always been central to questions of cartographic affectivity and effectivity; critical questions of coherence and in-

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<sup>5</sup>Susan Schulten, *The Geographical Imagination in America, 1880-1950* (Chicago, IL: University of Chicago Press, 2002).

<sup>6</sup>Daniel Cockayne et al., "On Economic Geography's 'Movers' to Business and Management Schools: A Response from Outside 'the Project,'" *Environment and Planning A: Economy and Space* 50, no. 7 (2018): 1510–8, doi:10.1177/0308518X18796506.

<sup>7</sup>Garrett Dash Nelson, "Mosaic and Tapestry: Metaphors as Geographical Concept Generators," *Progress in Human Geography* 43, no. 5 (October 2019): 853–70, doi:10.1177/0309132518788951; Lauren Martin and Anna J. Secor, "Towards a Post-Mathematical Topology," *Progress in Human Geography* 38, no. 3 (2014): 420–38, doi:10.1177/0309132513508209; Trevor J. Barnes, *Logics of Dislocation: Models, Metaphors, and Meanings of Economic Space* (New York, NY: Guilford Press, 1996); Patrick McHaffie, "Surfaces: Tacit Knowledge, Formal Language, and Metaphor at the Harvard Lab for Computer Graphics and Spatial Analysis," *International Journal of Geographical Information Science* 14, no. 8 (2000): 755–73, doi:10.1080/136588100750022778.

telligibility always lurk near the edges of the cartographic project.

In turning my attention to the aesthetics of epistemology, I am following a number of thinkers who have begun to evaluate how evidence functions rhetorically, and how aesthetics function to make information actionable. Jenny Rice, for example, has followed conspiracy theorists with an eye for how they muster evidence in support of strange and retrograde causes. She arrives at a theory of what she calls ‘archival magnitude’; following Aristotle, Rice places the manicured graspability of an argument front and center. Too much evidence and an argument becomes manic, incoherent, ungraspable. Too little and it becomes scant, marginal, suspect. Argumentation is, for Rice, an aesthetic project of locating the narrow seam of ‘just enough.’<sup>8</sup> Louise Amoore has mined similar insight from an evaluation of data visualization practice. She finds that it is not necessarily rigor, robustness, or significance that determine when risk detection software is ‘done’ and its insights become actionable;<sup>9</sup> it is, rather, the aesthetic qualities of the visualization. “It needs to look pretty,” says a software engineer interviewed in Amoore’s *Politics of Possibility*.<sup>10</sup> I note explicitly that this is the form of aesthetics I am engaging with, specific ways in which the sensible is ordered and distributed to achieve coherence and rhetorical effect. While my direct engagement with Rancière is minimal, his shadow looms over the work insofar as my project is to assess the force and valuation of specific forms of evidence.<sup>11</sup>

Following these lines back to the case at hand, I examine the use of layers, globes, and

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<sup>8</sup>Jenny Rice, *Awful Archives: Conspiracy Theory, Rhetoric, and Acts of Evidence* (Columbus, OH: Ohio State University Press, 2020).

<sup>9</sup>Louise Amoore, “Vigilant Visualities: The Watchful Politics of the War on Terror,” *Security Dialogue* 38, no. 2 (2007), doi:10.1177/0967010607078526.

<sup>10</sup>Louise Amoore, *The Politics of Possibility: Risk and Security Beyond Probability* (Durham, NC: Duke University Press, 2013).

<sup>11</sup>“the distribution of the sensible” is Rancière’s definition of aesthetics, see Jacques Rancière, *The Politics of Aesthetics: The Distribution of the Sensible*, trans. Gabriel Rockhill (London, UK: Continuum, 2004).

bridges in an expanded field of geographic inquiry. This means that I focus not only on disciplined geographers, but also on practitioners of adjacent disciplines, doing work explicitly or implicitly deemed geographical. Specifically, I spill a great deal of ink discussing the landscape architect Ian McHarg (1920-2001). McHarg became a figure strongly identified with the so-called ‘overlay paradigm’ in GIS following the success of his *Design with Nature* of 1969.<sup>12</sup> In this text, alongside a furious environmental polemic, he offered a technique for environmental design in which the designer was charged with overlaying mylar maps of geology, groundwater, soils, and other environmental factors. In the act of overlaying these phenomena, the designer would reveal the ‘intrinsic suitability’ of the landscape for human development. Later in his career, McHarg’s epistemic-aesthetic ambition would expand to include the entire world as an empirical ground for design. He became obsessed with planetary monitoring as a mechanism to improve the practice of urban planners, landscape architects, and others who take as their responsibility the form and function of human living.

However, in choosing to foreground the work of a designer, I also hold my second thread: that of futurity, anticipation... and anxiety. For McHarg, and design practitioners in general, a map is not merely a descriptive artefact but a propositional or generative device that seeks to materialize an intervention. While it has long been a critical cartographic commonplace that maps ‘produce the world’, reckoning with maps produced by designers and planners requires a different theoretical vocabulary.<sup>13</sup> From representation to pragmatics;

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<sup>12</sup>Ian L. McHarg, *Design with Nature* (Garden City, NY: The Natural History Press, 1969).

<sup>13</sup>This is a position advanced by e.g., James Corner, “The Agency of Mapping: Speculation, Critique, and Invention,” in *Mappings*, ed. Denis Cosgrove (London, UK: Reaktion Books, 1999), 213–52; Jill Desimini and Charles Waldheim, *Cartographic Grounds: Projecting the Landscape Imaginary* (New York, NY: Princeton Architectural Press, 2016).

from description to prescription.

## 1.2 AMENDING IT

I indulge here my own appetite for allegory.

The American folklorist Stith Thompson published the first volume of the *Motif-Index of Folk-Literature* in 1955.<sup>14</sup> It's a wonderful, obsessive text. Subtitled "A Classification of Narrative Elements in Folktales, Ballads, Myths, Fables, Medieval Romances, Exempla, Fabliaux, Jest-Books, and Local Legends," the *Motif Index* is a response to the troubling eruption of difference in the study of world folklore. Folklorists in the mid-20<sup>th</sup>-century were troubled by the multiplying fables, origin stories, and legends that arrived alongside expanding anthropological project. Thompson devised his index to tame this difference, an austere exercise in bibliographic tedium that is Modern almost to the point of parody.

The goal was nothing less than a "systematic analysis of the whole body of traditional literature." This required, as such things do, comprehensive schema for the classification of motifs and plot devices. "Take comfort, Enlightenment folklorist of the colonizer nations," the index seems to say. "Even when the stories aren't the same, their component parts are." While the many myths that play in the worlds of humans may follow distinctive narrative structures and serve diverse ritual and metaphorical purposes, the reader of the *Motif Index* is assured that they are nevertheless held together. The scholar is thereby granted permission to inventory and to catalog. In the *Motif-Index*, motifs and plot devices are strenuously siphoned, filtered, and distilled over the course of a very, very full seven volumes.

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<sup>14</sup>Stith Thompson, *Motif-Index of Folk Literature: A Classification of Narrative Elements in Folktales, Ballads, Myths, Fables, Mediaeval Romances, Exempla, Fabliaux, Jest-Books, and Local Legends.*, vol. 1 (Bloomington, IN: Indiana University Press, 1955).

I draw your attention to Chapter A, Mythologies, motifs 1000-1099: World Calamities.<sup>15</sup> In particular, motif A1010: Deluge, in which we learn that there are many ways to drown, and that flooding has many effects.<sup>16</sup> Floods can flow from our bodies, from blood, from deities “stamping on the floor of the heavens.”<sup>17</sup> As island nations and coastal cities begin to feel rising seas as a reality, rather than as a threat, it’s hard to escape the sense that events in the world have been scooped by the divine legalism of motif 1011.3: “God’s promise to never destroy world by water does not apply to local floods”<sup>18</sup> We can hear the Larsen C Antarctic Ice Shelf crack when we read motif 1016.3: “flood caused by melting ice after a great spell of cold.”<sup>19</sup> We only need to strain our ears a bit to hear “motif 1017: Flood caused to satisfy emotional need”<sup>20</sup> as “drill baby drill” echos through the halls of state houses and federal agencies.

This would all seem good and hopeless if it were not for motif A1020: Escape from Deluge.<sup>21</sup> Here we learn that humans have enlisted the help of objects again and again to escape the flood. Mythic humans have escaped in arks, gourds, caves, and casks, in a floating building, atop a mountain, an island, and a fish. They have also made their escapes on floating trees. Apparently, escaping from a flood is never a drama that unfolds in isolation; in most cases, it requires the design of an enclosure or an improvised buoy. Escape-from and defense-against are projects that humans undertake with objects and others, in partnership with barrel, cask, cave, and building. It requires architectural expertise, or at the very

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<sup>15</sup>Ibid., 1:182.

<sup>16</sup>Ibid., 1:184.

<sup>17</sup>Ibid., 1:185.

<sup>18</sup>Ibid., 1:185.

<sup>19</sup>Ibid., 1:185.

<sup>20</sup>Ibid., 1:186.

<sup>21</sup>Ibid., 1:187.

least a working knowledge of amphibious horticulture. Otherwise, how would we answer the question: which trees float?

But how do we see it coming? What scientific expertise and trade secrets are required to engineer a successful escape? And what are the objects and artifacts that allow us to speak clearly of the things that are befalling and will befall our worlds? Volume two of the index reveals that the media of the escape arts are as multiple as those of inundation events and escape acrobatics. Motif D1311: Magic object used for divination.<sup>22</sup> The toolshed of the fortune-teller is truly expansive. “Harp struck for divination.”<sup>23</sup> “Mirror answers questions.”<sup>24</sup> “Divination by water.”<sup>25</sup> Oracular twigs and trees, flames, artificial heads, and images. “Coconut shell answers questions.”<sup>26</sup> Combining numerology with horror, D1311.16.1. describes a myth in which the number of screams from a stone indicates the number of kings to descend from a man standing upon it. Grass, body parts, and excrement are all seen to give advice.

Why do I insist that my reader spend time with objects and floods, with the technologies that allow the characters and creatures of myth to forecast and dodge the danger of drowning? For me, this is a means of coming obliquely—but evocatively, I hope—at a set of epistemic aesthetics, and how they have drawn our attention to threatening environmental futures that require intervention. Maps, like mirrors answering questions, function propositionally in the work of McHarg, landscape architectural specialist in the prophetic represen-

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<sup>22</sup>Stith Thompson, *Motif-Index of Folk Literature: A Classification of Narrative Elements in Folktales, Ballads, Myths, Fables, Mediaeval Romances, Exempla, Fabliaux, Jest-Books, and Local Legends.*, vol. 2 (Bloomington, IN: Indiana University Press, 1956), 168.

<sup>23</sup>*Ibid.*, 2:168.

<sup>24</sup>*Ibid.*, 2:168.

<sup>25</sup>*Ibid.*, 2:170.

<sup>26</sup>*Ibid.*, 2:169.



tation of environmental threats, and frustrated world-physician whose prescriptions were often ignored. In this way, his career returns us to prominent components of our contemporary folklore: data promises to solve the world's problems even as those problems become less and less tractable. A new edition of the *Motif-Index*, expanded to include the mythologies of the 20<sup>th</sup>-century, would require the following addition: *data drives the prophet, who knows and knows well.*

Prophecy is not only description; it is re-description and a call for change.<sup>27</sup> In at least this way, the stories we tell ourselves as inheritors of the critical traditions are a bit constrained. Following the so-called 'crisis of representation,' we've been left with a great many stories about the gradual falling-away of certainty and the performativity of knowledge. However, beyond the anxiety that comes with unknowing, there is also anxiety that comes with the realization that even were 'we' to arrive at a collective sense of what is, such a description is never sufficient to change that world. Maps do work, certainly, but in unpredictable ways. This must trouble us; I theorize this trembling as 'ought anxiety,' a pragmatic extension of the representational anxieties that have wracked the humanities and social sciences for the last forty-odd years. 'Ought anxiety' drives us to develop prophetic techniques: what are the qualities of the hunger that the limited knowability of the world puts in our belly? For data. For descriptions. For new representations. For new maps.

### 1.3 ON THE SLIPPERINESS OF DISSERTATIONS

At the onset of my doctoral training, I envisioned this project quite differently, though many of my theoretical fixations—intervention, aesthetics, failures, figurations of knowledge—

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<sup>27</sup>Cornel West, *The American Evasion of Philosophy: A Genealogy of Pragmatism* (Madison, WI: University of Wisconsin Press, 1989); Cornel West, *Prophetic Fragments* (Grand Rapids, MI: William B. Eerdmans Publishing, 1993).

remain largely unchanged. I had watched climate change take center stage in political discourse, albeit in a ‘balanced’ way that ensured equal representation from affirmative and denialist positions. I had also watched, with frustration, the state respond to climate change with big-budget, business-friendly coastal redevelopment projects and investments in infrastructure. Finally, I saw the ascendancy of a kind of design project that used representations of reality (maps) to catalyze support for interventions (plans). I had read enough in the history of philosophy to recognize a classical fallacy—it is fallacious to derive an ‘ought’ statement from an ‘is’ statement. I was also intrigued. Assuming the immense difficulty of moving from an image of the world to a prescription for that world, *how did they do it?* How was the climate-changed future brought to bear on the development of a design proposal? How was the future, in which seas were higher, weather more erratic, mean surface temperature hotter, and coastal cities more vulnerable, being made present as an object of designerly intervention? To answer these questions, I proposed a design ethnography involving a long period of participant observation at a major landscape architecture firm engaged in coastal resilience projects.

The text before you does lock horns with these questions, but comes to conclusions using different materials. I do ask how landscape architects arrive at interventions given available information. My interest in cartographic forms of futurity remains. My interest in the plan as a type of cartography requiring special theoretical treatment remains. My interest in the difficult path from drawing to built form is unaltered. But where I proposed a contemporary examination of design practice, I submit for consideration a historical investigation the same. Where I proposed to ask after designers’ responses to climate change, I instead ask after designers’ responses to the environmental crises of the mid-century; less ‘sea level rise,’

more ‘point source pollution.’ Where I proposed to examine Scape, Interboro, West 8, or any number of other prominent design firms, I instead ask after a figurehead for a certain kind of environmental design practice (evidence-based and aspirationally scientific), who was often invoked as precedent by those same firms.

I found, furthermore, that many of the questions I had regarding the cartographic practices of designers could be reflected back to geographers. Designers were making use of forceful representations that purported to convene multiple forms of scientific knowledge. In this, I recognized a move favored by the geographer when in conversation with either academic administrators or strangers at parties. When I leaned in to examine the use of synthetic knowledge by other disciplines, I inadvertently found a reflecting pool. I had begun a study of the University of Michigan’s department of geography, a study that was, admittedly, imagined as an unrelated side project. However, in early reflection on the empirical evidence, I saw that geographers fell back on the idea that the discipline stitches connective tissue between the divergent natural and social sciences—an epistemic aesthetic that I call the ‘bridge.’ I also saw that this did not go well. Intrigued, I drew this into the broader project. If my first two chapters investigate epistemic-aesthetic means of presencing futures, the last investigates the future of an epistemic aesthetic as it relates to geographic inquiry.

#### 1.4 LAYER, GLOBE, BRIDGE

In this first chapter, I examine the ‘layer’ in the discipline-building work of Ian McHarg: a form of evidence in which multiple environmental phenomena are imagined interdependently over a bounded horizontal extent. This epistemic aesthetic was consistent with a milieu that formed around expertise-driven approaches to environmental regulation in the

post-war period. Inventory methods, always McHarg's calling card, became a structuring rubric by which still-young national environmental agencies and supranational bodies were to be restructured. I use this period to draw a throughline between the methodological arc of McHarg's projects and the way that informational and disciplinary holism has been figured in geography. In a "Geographers on Film" interview, McHarg—the only non-disciplined geographer to be interviewed as part of the AAG-sponsored series—praises the holism of Carl Sauer's regional geography as a precedent and promise.

Along the way, I develop a theory of what I call 'ought anxiety'. I am, of course, building on a lineage of thought in the humanities that has repeatedly figured and refigured intellectual 'anxieties': 'cartesian anxiety',<sup>28</sup> 'epistemological anxiety',<sup>29</sup> 'anxieties of control',<sup>30</sup> and 'cartographic anxiety'.<sup>31</sup> I build on what the architectural theorist Robin Evans calls 'reversed directionality' in architectural drawing—"drawing in architecture is not done after nature, but prior to construction"<sup>32</sup>—to argue that the anxieties enumerated after the crisis of representation don't account for the frailty of cartographic evidence. A map, when drawn in the service of a plan, is neither determinative nor passively representational. It makes a case, but

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<sup>28</sup>Richard J. Bernstein, *Beyond Objectivism and Relativism: Science, Hermeneutics, and Praxis* (Philadelphia, PA: University of Pennsylvania Press, 1983); Susan Bordo, "The Cartesian Masculinization of Thought," *Signs* 11, no. 3 (1986): 439–56, <http://www.jstor.org/stable/3174004>; David Sibley, "Sensations and Spatial Science: Gratification and Anxiety in the Production of Ordered Landscapes," *Environment and Planning A* 30, no. 2 (1998): 235–46.

<sup>29</sup>Lorraine J. Daston and Peter Galison, *Objectivity* (New York, NY: Zone Books, 2010); Kate Crawford, "The Anxieties of Big Data," *The New Inquiry*, May 30, 2014, <http://thenewinquiry.com/essays/the-anxieties-of-big-data/>.

<sup>30</sup>Agnieszka Leszczynski, "Spatial Big Data and Anxieties of Control," *Environment and Planning D: Society and Space* 33, no. 6 (2015): 965–84, doi:10.1177/0263775815595814.

<sup>31</sup>Derek Gregory, *Geographical Imaginations* (Malden, MA: Wiley-Blackwell, 1994); Sankaran Krishna, "Cartographic Anxiety: Mapping the Body Politic in India," *Alternatives: Global, Local, Political* 19, no. 4 (1994): 507–21, doi:10.1177/030437549401900404; John Pickles, *A History of Spaces: Cartographic Reason, Mapping, and the Geocoded World* (London, UK: Routledge, 2004); Joe Painter, "Cartographic Anxiety and the Search for Regionality," *Environment and Planning A* 40, no. 2 (2008): 342–61, doi:10.1068/a38255.

<sup>32</sup>Robin Evans, "Translations to Drawing to Building," in *Translations from Drawing to Building and Other Essays* (London, UK: Architectural Association, 1997), 152–93.

always finds pushback... if it finds an audience at all. McHarg, though bearing the markers of the enlightenment subject who is the figure of cartographic-cartesian anxieties, quakes and strives not because there may be no solid ground, but because even forceful depictions of the ground, more often than not, do not effect predictable change.

In my second chapter, I examine the ‘globe’, a form of evidence, well-known by geographers, in which all things in all places are imagine inter-relating, requiring the radical extension of a study’s horizontal extent. To do so, I narrate at a series of projects in the 1980s in which Ian McHarg’s practice sought to upscale his analysis from the regional approaches with which he is associated to continental and planetary scales of analysis. Alongside these projects, McHarg had become a non-technical GIS consultant—with a new firm Expert Information Systems (EIS)—a regular keynote speaker at GIS conferences, and a proselyte for national and global environmental inventories. In this body of work, I examine the role of geocomputation in constructing the planetary as a scale for thought and action. I also locate its divergent political possibilities; while many have analyzed the planetary optic in terms of phallogocentrism, colonialism, and military technoscience, I note the recent arrival of new theoretical stances more generous in their assessment of the earth. These first two chapters are based on archival research at Penn, MIT, the Rockefeller Foundation, and the Harvard Graduate School of Design, as well as oral history interviews with McHarg’s former colleagues.

In this final chapter, written and researched with contributions from Matthew Rosenblum, I examine a form of evidence that I call the ‘bridge’ in the context of disciplined geography: this is an epistemic aesthetic in which disciplines are imagined as isolated, but bridgeable by a meta-discipline able to develop means of working between and across. In

doing so, I bring the dissertation back to academic geographic inquiry, namely its period of acute collapse in early-to-mid-1980s. The University of Michigan's Department of Geography was discontinued in 1981, after a grueling review process that saw the discipline's identity and institutional role very publicly called into question. Despite the fact that Michigan's department was central to most of 20th-century academic geography's major intellectual movements, it was also the first in a rash of closures throughout the 1980s that also claimed departments at Pitt, Columbia, Northwestern, and Chicago. We argue that fiscal austerity following gradual disinvestment throughout the 1970s did not cause the closure, though it did raise the question: which disciplines were least essential to the university? At least several influential actors at Michigan had been prepared to answer 'geography' since the mid-1970s. This answer was at the ready for reasons that had a great deal to do with the department and discipline's self-defense, as a 'bridge' discipline between the natural and social sciences (and its misalignment with its actual practices).

This dissertation is based on research conducted in a range of archives over the course of several years; these are listed in Appendix A. All archival research is, of course, highly partial and subject to deliberate and inadvertent. For this reason, archival work was supplemented with oral histories through which I sought to both corroborate and complicate the evidence found in visits to the archive. These are also listed in Appendix A.

In these three chapters, I am making notes towards a schematic theory of how aesthetics figure into the presentation of evidence within and adjacent to geography. Specifically, I note how aesthetic forms of epistemic claims wax and wane in their ability to convince—ways of integrating knowledge exist alongside shifts in academic and intellectual culture that approach these forms of integration with similarly-shifting degrees of suspicion and

generosity. This is, ultimately, an argument about cartography and geographic inquiry as *rhetoric* that can convince, bring along, and impress... even as it fails, frequently, to do any of these things.

#### 1.5 CODA: A CLOSING NOTE ON TONE

I presented a very, *very*, early draft of this volume's second chapter at the Dimensions of Political Ecology conference in Lexington, Kentucky in February 2016. I was beginning to play with some of the images and empirics I have adopted here, messing about with the foibles, failures, and frailties of McHarg's strident intellectual life. I was, at the same time, conducting some experiments with tone. In the preceding months, I had begun to grow weary of the critical tone, of the tacit requirement that the affective range of scholarship be limited to a spectrum that ran between acidic and ironic, strident and sneeringly condescending. What shapes can a scholar's mouth make? What contours can their facial landscape hold? How deep might be the crags in their smile lines? How are the corners of their smile stippled? Do their eyes sneer? When their tongue flashes in speaking, is it forked? I presented a paper that drew attention to the absurdity of McHarg's planetary-ecological ambition as an antidote to the miserableism that is too often seen as the necessary accomplice and outcome of academic labor.

The question and answer session began. The first question went something like this: "your analysis is symptomatic of a vexing problem with the critical disposition; that we think it appropriate to laugh at our research subjects with a sly wink to the audience. Don't you think that we need to be less cruel?" I was surprised by this—after I bumbled through an inadequate answer, a senior scholar to whom I am deeply indebted raised their hand in my

defense, and I ran out the clock in the time-honored tradition of academics foolish enough to allocate time to paper sessions. Which is to say that I don't remember it. But the question was sticky. My antidote to the critical disposition was heard as exemplary—symptomatic, what a word!—of the critical disposition. My argument was reduced to a mere symptom, the sore that expresses the virus, the social relation that reveals the logic. And to think, I thought I was attempting to caffeinate what had become tired in the practice of critique!

What I realized in this moment was what scholars associated, for better or worse, with what has been called post-critique argue; that argument is a matter of substance, genre convention, and tone.<sup>33</sup> Indeed, in a pleasing synchrony with the argument I make above: argument is aesthetic! While I was attempting to stir the pot a bit as far as genre conventions and tone were concerned, I was doing so superficially. I was substituting a sneering laugh for a sneering grimace. Which is all to say that, in what follows, I have attempted to take my critic's comment to heart and reorganize both my tone and my substance. I seek to avoid criticism in the sense of dismissiveness or cruelty to the deeply held (and to that extent, 'true') senses of the world of the figures that appear in my research.

After all: this is a project addressed to question of what we ought to do about what we have enticed the earth to tell us; and on that front, we are very much running out of time.

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<sup>33</sup>The exemplary texts are Rita Felski, *The Limits of Critique* (Chicago, IL: University of Chicago Press, 2015); Elizabeth S. Anker and Rita Felski, eds., *Critique and Postcritique* (Durham: Duke University Press, 2017); Jeff Pruchnic, "Postcritical Theory?: Demanding the Possible," *Criticism* 54, no. 4 (2012): 637–57, doi:10.2307/41850887.



*Layers and the Integration of Environmental Knowledge*

The arguments that are normally mobilized in plaintive bleeding-heartism are clearly inadequate to arrest the spread of mindless destruction. Better arguments are necessary. The accumulation of some evidence of the ways of the working world produces an effective starting point. In the remarkably unsuccessful early years of my battles against the philistines I found that proffering my palpitating heart accomplished little remedy but that the diagnostic and prescriptive powers of a rudimentary ecology carried more weight and had more value.

—Ian McHarg, *Design With Nature* (1969)

“A sense of crisis has brought us together.”<sup>1</sup> So begins the “Declaration of Concern”, a document written and signed in 1966 by Campbell Miller, Gray Clay, Ian McHarg, Charles Hammond, George Patton, and John Simonds, all prominent landscape architects of the day. The crisis they speak of is that which launched the environmental movement of the 1960s, broadcast on frequencies of belching point-sources, flaming rivers in a rust belt that was only just beginning to rust, rapacious exurban development, smokestacks speckled by coal ash and film grain. They envision the future life of that crisis as a generalized condition: “what is merely offensive or disturbing today threatens life itself tomorrow.”<sup>2</sup>

This threatening future called for intervention. Furthermore, it required the formulation of a broad, integrative knowledge-based practice for landscape architects. In the words of the declaration, “those who plan for the future must understand natural resources and processes. ... They must know geology, physiography, climatology, ecology to know why the

<sup>1</sup>Campbell Miller et al., “A Declaration of Concern” (Landscape Architecture Foundation, 1966), n.p.

<sup>2</sup>Ibid., n.p.

world's physical features are where they are; and why plants, animals and man [sic] flourish in some places and not in others. ... Only then are they qualified to plan and design the environment."<sup>3</sup> A tall order and a priestly knowledge politics: one becomes qualified to draw upon the surface of the future by knowing a thing or two about systemetizable causes. The declaration continues, "there is no 'single solution' but groups of solutions carefully related one to another. There is no one-shot cure, nor single-purpose panacea, but the need for collaborative solutions. A key to solving the environmental crisis comes from the field of landscape architecture."<sup>4</sup>

Much of this is familiar. Fifty-plus years later, it is commonplace to live wracked by the dread of environmental crisis; many find themselves rooming with the anxieties that accompany looming ecological collapse. It is early days for a generalized disturbance that promises to become a permanent existential threat, and, if anything, it has only become less optional to agree that the time for action is now. In so many ways we can see foreshadowed contemporary critical theories of threat. We could point to the self-legitimizing work of threat: following Massumi, the threat legitimizes any action regardless of the occurrence of the threatened event.<sup>5</sup> We could point to the de-politicization of decision through an appeal to apocalypse: after Swyngedouw, the apocalyptic imagination of crisis is an anti-democratic political paralytic.<sup>6</sup> In the invocation of scenario-esque sets of solutions, we

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<sup>3</sup>Ibid., n.p.

<sup>4</sup>Ibid., n.p.

<sup>5</sup>Brian Massumi, "National Enterprise Emergency: Steps Toward an Ecology of Powers," *Theory, Culture & Society* 26, no. 6 (2009): 153–85, doi:10.1177/0263276409347696; Brian Massumi, "The Future Birth of the Affective Fact: The Political Ontology of Threat," in *Digital and Other Virtualities: Renegotiating the Image*, ed. Antony Bryant and Griselda Pollock, New Encounters: Arts, Cultures, Concepts (London, UK: I. B. Tauris, 2010).

<sup>6</sup>Erik Swyngedouw, "Apocalypse Forever?: Post-Political Populism and the Spectre of Climate Change," *Theory, Culture & Society* 27, nos. 2-3 (2010): 213–32, doi:10.1177/0263276409358728; Erik Swyngedouw, "Apocalypse Now! Fear and Doomsday Pleasures," *Capitalism Nature Socialism* 24, no. 1 (2013): 9–18, doi:10.1080/10455752.2012.759252.

could see foreshadowed the rise of what Louise Amoore has called the ‘politics of possibility.’<sup>7</sup>

Yet, if we strain our ears, we might hear something quite different. I hear a distinct form of anxious anticipation which promises to prevent bad surprises by epistemic means. If environmental crisis loomed for the world in which the assembled designers dwelled—and on this count, at least, there can be no controversy—the solution was a new practice of landscape design that convened many knowers to integrate their knowns. In so doing, human etchings on the plan drawing—which often become, however haltingly, material realities on the surface of the earth—will be cartographically arrayed in just such a way; a way that averts the worst of what is to come by proposing alternatives. If, as Noortje Marres has reminded us, “issues spark a public into being,”<sup>8</sup> the environmental crisis was an issue calling for new scientific publics comprised of scientific subjects who were willing and able to wield knowledge projectively.

In what follows, I turn to a historical examination of the work of Ian McHarg (1920-2001), one of the signatories of the New Landscape Declaration. He is also a figure frequently invoked by GIScientists in search of origin stories for what is variously called the ‘overlay paradigm’ or the ‘layer cake’. My aspiration is to take this origin story seriously... which is quite different from evaluating its truthfulness. Indeed, even a cursory glance at the history of both geography and landscape architecture is enough to disprove the raw factuality of McHarg’s claim to have ‘invented’ the map overlay. Despite this, I choose to take GIScientists and historians of the discipline at their words when they trace their methods through to McHarg. In doing so, I suggest that to invoke McHarg is to invoke the spectre of *de-*

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<sup>7</sup> Amoore, *The Politics of Possibility: Risk and Security Beyond Probability*.

<sup>8</sup> Noortje Marres, “Issues Spark a Public into Being: A Key but Often Forgotten Point of the Lippmann-Dewey Debate,” in *Making Things Public: Atmospheres of Democracy*, ed. Bruno Latour and Peter Weibel (Cambridge, MA: The MIT Press, 2005), 208–17.

*sign, of intervention, of maps that function propositionally instead of only representationally.* This, I argue, requires a substantially different theoretical orientation. Less epistemology, more aesthetics. Taking McHarg as an on-ramp to the history of geocomputation allows us to see why I am dissatisfied with languages of ‘inscription’ and of ‘producing the world’, through which a simplistic quasi-determinism tends to creep. It also suggests why I am equally dissatisfied with simplistic treatments of maps as entirely subject to their affects and encounters, through which creeps a kitsch dismissal of intention and authorship.<sup>9</sup>

I proceed as follows. I begin by placing McHarg within histories of GIScience. In these, he often appears as having done the intellectual leg-work for the community of practice. While this is untrue—McHarg neither invented nor implemented the method with which he is credited—his invocation in our histories matters, and suggests what might matter. It ties GIScience to a particular form of environmentalism born at the mid-century in which environmental knowledge producers were assembled to speak about what might befall the landscape in the absence of intervention. I subsequently define what I call ‘ought anxiety’ as an extension of the various anxieties articulated by humanists and social scientists since the so-called ‘crisis of representation’. I argue that we have focused too narrowly on the fear that follows the thinning of correspondence and the shattering of mirrors, to the detriment of our ability to think about knowledge wielded rhetorically and propositionally; I do so with reference to recent thought that analyzes the aesthetic evaluation of evidence. Empirically, I examine the disciplinary and departmental means through which McHarg sought to construct layered interdisciplinarity in the best-known part of his career. Finally, I begin to

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<sup>9</sup>The former finds its exemplary articulation in Pickles, *A History of Spaces: Cartographic Reason, Mapping, and the Geocoded World*; the latter in “post-representational” theories of cartography, see Rob Kitchin, Justin Gleeson, and Martin Dodge, “Unfolding Mapping Practices: A New Epistemology for Cartography,” *Transactions of the Institute of British Geographers* 38, no. 3 (2013): 480–96, doi:10.1111/j.1475-5661.2012.00540.x.

turn towards his later interest in geocomputation and GIS, examining its early failures, and using these as an entry point for reflection on how forms of evidence can calcify and lose their suggestive potency.

## 2.1 MCHARG IN HISTORIES OF GIS

In 1997, Jack Dangermond—founder and CEO of Environmental Systems Research Institute, or Esri—took to the stage at the company’s annual User Conference (UC) in San Diego. Addressing the masses of GIS specialists, cartographers, spatial analysts, researchers, academics, and others comprising the audience at the annual event, he welcomed the landscape architect and urban planner Ian McHarg to the stage to receive the President’s Medal. In introducing McHarg, he pointed to an intellectual debt owed. “The notion of ‘map overlay’ or ‘polygon processing’ [has] its roots with, I believe, its founder: Ian McHarg.”<sup>10</sup> This is a patent historical falsehood.<sup>11</sup> As I detail below, there were many instances of planners and landscape architects using similar methods well before McHarg promulgated his methods through his enormously successful *Design With Nature*.<sup>12</sup>

However, beyond the false foundings and dubious origin stories, Dangermond does something interesting. In addition to tracing a route through history, he attributes to McHarg an advisory role, and stresses his discipline: “he’s given us guidance, especially me, in where we take this technology. Most of today, we’ve been overwhelmed by the technology *stuff*.”

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<sup>10</sup>*Ian McHarg at the 1997 ESRI User Conference, Part 1 - YouTube*, 2009, [https://www.youtube.com/watch?v=6PfcKtcc\\_jA](https://www.youtube.com/watch?v=6PfcKtcc_jA), n.p.

<sup>11</sup>On the falsehood of his claim to paternity, see Carl Steinitz, Paul Parker, and Lawrie Jordan, “Hand-Drawn Overlays: Their History and Prospective Uses,” *Landscape Architecture* 66, no. 5 (1976): 444–54; Anne Whiston Spirn, “Ian McHarg, Landscape Architecture, and Environmentalism: Ideas and Methods in Context,” in *Environmentalism in Landscape Architecture*, ed. Michel Conan (Washington, DC: Dumbarton Oaks, 2000), 97–114; Margot Lystra, “Drawing Natures: US Highway Location, Representational Techniques and the Rise of Ecological Design,” *Journal of Design History* 30, no. 2 (2017): 157–74, doi:10.1093/jdh/epw013.

<sup>12</sup>*Design with Nature*.

While the technology stuff is moving along, much of the underpinnings for it, the concepts for integrating natural processes are not being shown today—they're being implied. And in many ways, the methods that Dr. McHarg<sup>13</sup> has invented and theorized have yet to come to fruition in your practices and your thinking. Please join me in welcoming Ian McHarg, a landscape architect.”<sup>14</sup>

Dangermond's reliance on McHarg's legacy is distinguished from many geographers and GIScientists in the sense that it is not only retrospective, but also prospective. The McHarg event is not only a root to trace, but a promise to fulfill. Dangermond has taken to stressing the relevance of landscape architecture and of design recently, drawing out implicit linkages between the institutions where he was trained and the history of GIS. In a recent interview, Dangermond is asked what role his training as a landscape architect played in shaping his thinking:

I studied landscape architecture at Harvard University and got exposed to using early computing technology to study the earth's landscape. I had already been doing geographic analysis manually; but at Harvard, I learned that it could be done much more quickly and more accurately with the help of computers. I could see that there was great opportunity to use these new data processing and computing technologies to change the way landscape architecture and environmental planning were done and, as a result, to have a profound impact on the world.<sup>15</sup>

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<sup>13</sup>McHarg was awarded several honorary doctorates, but had no formal doctoral training.

<sup>14</sup>*Ian McHarg at the 1997 ESRI User Conference, Part 1 - YouTube*, n.p.

<sup>15</sup>Sarah Wray, “We Are Limited Only by Our Collective Imaginations (Interview with Jack Dangermond),” *ArcUser*, 2015, 37.

Changing how disciplines are done. Impact on the world. What is laid bare here is something that has always mystified descriptively-inclined, proscription-averse geographers: that GIS, and we can fairly say maps, have never only been representations. They perform a constitutive role in building the operative field constituted by the known; in other words, maps are the basis for plans. Geographers tend to forget this in their theorizing: that cartographic practice is a conventionalized set of drawing techniques, design methods, and worlding exercises, which often proceed without any pretense to mere description.

For Dangermond, it often seems that such prospective cartography *is* geography. In 2007, the opening session of the Esri user conference was on the ‘GIS and the Geographic Approach’. In a truly strange citational matrix that argues for ‘the geographic approach’—“a new way of thinking and problem solving that integrates geographic information into how we understand and manage our planet”—the sole citation is to McHarg, a non-geographer. Yet, this non-geographer is also an exemplar of how “geographers study and analyze our world” who who “lays out a philosophical context for why and how humans should manage these activities within natural and cultural landscapes.”<sup>16</sup>

This managerial vision of geographic inquiry is consistent with Esri’s recent ambitions, underwriting what it calls ‘Geodesign’ through the creation of new academic programs, new academic conferences, new publications, and new technologies.<sup>17</sup> An almost ludicrously whiggish and anachronistic timeline of ‘Geodesign’ published by Esri identifies as prior

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<sup>16</sup>Jack Dangermond, “GIS—the Geographic Approach,” 2007, <https://www.esri.com/news/arcnews/fall07/articles/gis-the-geographic-approach.html>, n.p.

<sup>17</sup>For the text sold by Esri as definitive, see Carl Steinitz, *A Framework for Geodesign: Changing Geography by Design* (Redlands, CA: Esri Press, 2012); for critical assessments of Geodesign, see Matthew W. Wilson, “On the Criticality of Mapping Practices: Geodesign as Critical GIS?” *Landscape and Urban Planning* 142 (2015): 226–34, doi:10.1016/j.landurbplan.2013.12.017; Jeremy W. Crampton, Eric Robsky Huntley, and Emily C. Kaufman, “Societal Impacts and Ethics of GIS,” in *Reference Module in Earth Systems and Environmental Sciences* (Oxford, UK: Elsevier, 2017), <https://doi.org/10.1016/B978-0-12-409548-9.09628-7>.

‘Geodesigners’ Frank Lloyd Wright, Richard Neutra, Warren Manning, Ian McHarg, and Howard Fisher all of whose work is continued today by Carl Steinitz, Jack Dangermond, and Michael Goodchild. I am struck, if not surprised, by the fact even though “the main idea underlying the concept of geodesign ... has been with us since the beginning of time,”<sup>18</sup> they could not find a single non-male person or person of color worth identifying.<sup>19</sup>

McHarg makes a founding appearance on page three of Nadine Schuurman’s *GIS: A short introduction*. Schuurman traces the development of GIS’s epistemological and technical substrates to a highway routing project undertaken by McHarg’s firm on behalf of Princeton, New Jersey residents, who had organized against a proposed route for I-95. In brief: Princetonians, fearful of the changes that would come to their community with the arrival of the highway, seized McHarg’s ear following an address given at the Princeton Institute for Advanced Study.<sup>20</sup> They requested his assistance in developing alternative routes; in response, he conducted a 6-week study that was published in several venues.<sup>21</sup> In this study, his firm mapped areas of high ‘social value’ (indicated by residential property values and ‘recreational values’) and overlaid these with areas with obstructive natural features (steep slopes, susceptibility to erosion), producing a composite cartography of minimum social cost and maximum social benefit.<sup>22</sup> Schuurman describes this project as the origin of

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<sup>18</sup>William R Miller, *Introducing Geodesign: The Concept* (Redlands, CA: Esri Press, 2012), 4.

<sup>19</sup>This isn’t an isolated instance. For example, on International Women’s Day in 2019, I received a mailer encouraging my participation in the Esri User Conference. It included four photos with 20 foregrounded figures. Of these, three expressed as women. My contemporaneous rage-Tweet can be found here.

<sup>20</sup>For the curious, this address is published as Ian L. McHarg, “Theory of Creative Fitting,” in *Ian McHarg: Dwelling in Nature*, ed. Lynn Margulis, James Corner, and Brian Hawthorne, Conversations with Students (New York: Princeton Architectural Press, 2007).

<sup>21</sup>Ian L. McHarg, “Where Should Highways Go? Comprehensive Route Selection Method Gets Most Social Benefit at Least Social Cost,” *Landscape Architecture* 57, no. 3 (1967): 179–81; Ian L. McHarg, “A Comprehensive Highway Route Selection Method,” 1968.

<sup>22</sup>For a thorough discussion of this project, see Lystra, “Drawing Natures: US Highway Location, Representational Techniques and the Rise of Ecological Design” and the fourth chapter of Margot Lystra, “Envisioning Environments: Designs for Urban U.s. Freeways, 1956-1968” (Dissertation, Cornell University, 2017), titled



polygon overlay geoprocessing, or what she calls the “*sin qua non* methodology of GIS.”<sup>23</sup> McHarg’s transparent sheets with semi-opaque polygonal cutouts were laid on top of each other and backlit by a light table, strongly suggesting suitable landscapes; a GIS by any other name...<sup>24</sup>

Denis Cosgrove similarly notes that McHarg is “commonly credited with pioneering the cartographic techniques now computerized within Geographical Information Science.”<sup>25</sup> For Cosgrove, McHarg sits at the end of a familiar thematic-cartographic arc that begins with John Snow’s cholera study, detours through the civil hygienist movement of the 20th century United Kingdom—particularly the work of civil surveyor Patrick Geddes—arrives at modernist planning, and finds a route to McHarg through the ecological design tradition. This is a well-trod genealogy. Geddes’s student and McHarg’s colleague, the urban historian Lewis Mumford, extrapolates this lineage further in his introduction to *Design with Nature*<sup>26</sup>: not only Geddes but also Rachel Carson, Hippocrates, Benton MacKaye, George Perkins Marsh, and Henry Thoreau appear as examples of ‘work in a similar vein.’<sup>27</sup>

McHarg was invited to contribute the foreword to Foresman’s authoritative edited history of geographic information systems.<sup>28</sup> Seventy-eight years old and in poor health at the time

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“Landscapes of Cost and Contradiction: Highway Location and the rise of environmental planning.”

<sup>23</sup>Nadine Schuurman, *GIS: A Short Introduction* (Malden, MA: Blackwell, 2004), 3.

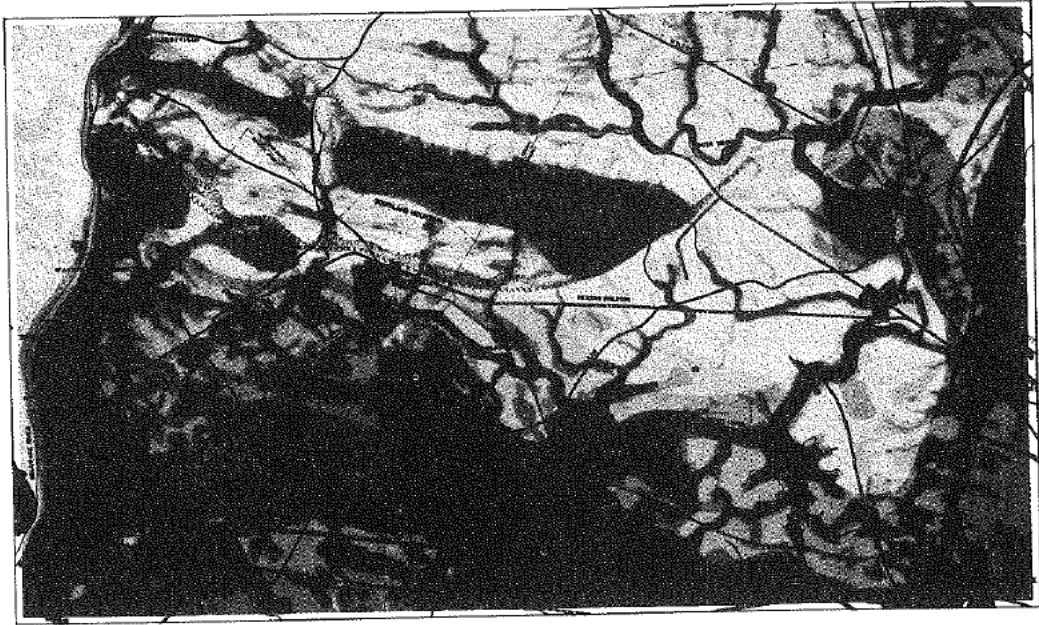
<sup>24</sup>Margot Lystra notes—with characteristic attention to the materials of representational production—that even though these were often identified as mylar, they were more likely to be sheets of acetate. Lystra, “Drawing Natures: US Highway Location, Representational Techniques and the Rise of Ecological Design.”

<sup>25</sup>Denis Cosgrove, *Geography & Vision: Seeing, Imagining, and Representing the World* (London, UK: Tauris, 2008), 166.

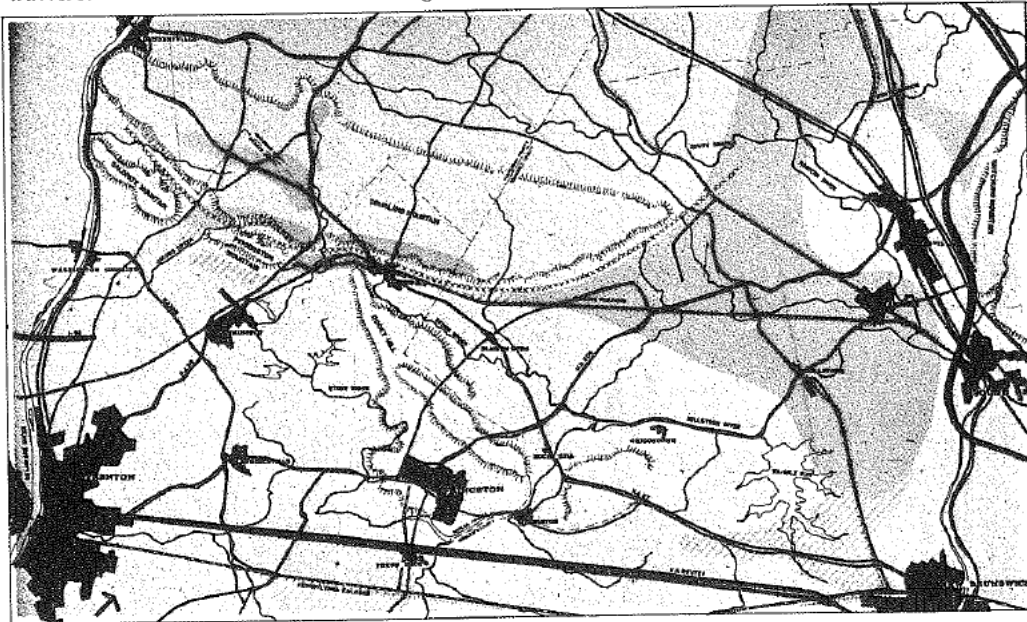
<sup>26</sup>Lewis Mumford, “Introduction,” in *Design with Nature*, by Ian L. McHarg (Garden City, NY: Doubleday, 1969).

<sup>27</sup>MacKaye is worthy of further study by geographers, particularly given the degree to which he was influenced by Nathaniel Shaler and William Morris Davis; see Peter Hall, *Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century*, 4th ed. (Malden, MA: Wiley-Blackwell, 2014). Such work might begin with his theory of ‘geotechnics’, or his *The New Exploration: A Philosophy of Regional Planning*, on planning the Massachusetts Somerset Valley, Benton MacKaye, *The New Exploration: A Philosophy of Regional Planning* (1928; repr., Harpers Ferry, WV: Appalachian Trail Conservancy, 2010).

<sup>28</sup>Timothy W. Foresman, ed., *The History of Geographic Information Systems: Perspectives of the Pioneers*



*Composite of all social values in the area: the darkest value shown here was assigned to factors offering most physiographic or social-value obstruction to the highway.*



*Minimum social value area: In contrast, lightest areas shown on this map represent the lowest social values extant, and the minimum physiographic obstructions to proposed highway. Striped areas have relatively less value.*

Figure 2.1: Minimum and maximum social value areas for I-95 alignment. Original in McHarg's "Where should highways go?", Landscape Architecture, 1967.

of its publication, McHarg writes from the bemused position of a early advocate. By this point, McHarg was a pronounced computational optimist, convinced that GIS—defined as “the systematic introduction of numerous different disciplinary data, connected by their shared location on the planet, which can be used to record an inventory of the environment, document observation of change and constituent processes, and permit predictions based on current practices and management plans”<sup>29</sup>—can contribute to an integrated science for the solution of complex problems.

While problems increase in complexity, it is gratifying to observe that our ability to understand and manage has been enormously expanded by the new prostheses—environmental science, sensors, satellites, and not least, computers. The one inadvertent benison of computation is its capability of integrating data and perceptions from the full range of environmental sciences. This may well be its most significant contribution. We are buried in data. We desperately need integration. Computers can assist triumphantly in this quest.<sup>30</sup>

McHarg’s role in the articulation of the geocomputational imagination even makes an appearance as a fruitful subject of inquiry in the materials produced by Initiative 19 of the National Center for Geographic Information and Analysis (NCGIA)—what became the GIS and Society agenda. “The Social Implications of How People, Space, and Environment are Represented in GIS”, for the conveners of a specialist meeting held in March of 1996 in (Upper Saddle River, NJ: Prentice Hall, 1998).

<sup>29</sup>Ian L. McHarg, “Foreword,” in *The History of Geographic Information Systems: Perspectives of the Pioneers*, ed. Timothy W. Foresman (Upper Saddle River, NJ: Prentice Hall, 1998), ix–x, ix.

<sup>30</sup>*Ibid.*, x.

South Haven, Minnesota, included a pronounced historical concern.<sup>31</sup> One of the priority project areas identified by the researchers present was ‘The Social History of GIS’. And such a history had its own demands: that researchers be, on the one hand, sensitive to the path dependencies and lock-in that created the sociotechnical worlds in which we now dwell. But that they also be attuned to a certain degree of internal variability: between institutions, between social settings, between disciplines... social histories of GIS must therefore attend to *both* the consolidation of the GIS market—the making-monolithic of GIS *qua* GIS—and its variability between practice domains.

The pursuit of just such a social history was the goal of the GIS History Project, formally launched at an Initiative 19-funded workshop in Santa Barbara, California in September 1996. At this workshop, ‘high priority’ sites were identified: among others, the U.S. Census Bureau, particularly insofar as it developed the Dual Independent Map Encoding system in order to automate geocoding processes for the 1970 census; the Harvard Laboratory for Computer Graphics (and Spatial Analysis), as the originators of SYMAP, ODYSSEY, and therefore Arc/Info; and a comparative study of the corporate cultures of Esri and Intergraph.<sup>32</sup> However, the list continued to grow following the workshop and, alongside a list of other additional sites for inquiry we see a name, indeed, the only item in the list of sites which gives primary importance to a name rather than an institution: “Ian McHarg and the ‘Overlay Paradigm.’” This line, like the multiplicity of others, went untraced. Professors get tenure and burn out. Initiatives lose their urgency. The GIS History Project’s website was

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<sup>31</sup>Trevor Harris and Daniel Weiner, “GIS and Society: The Social Implications of How People, Space, and Environment Are Represented in GIS” (National Center for Geographic Information and Analysis, 1996).

<sup>32</sup>David M. Mark et al., “The GIS History Project” (UCGIS Summer Assembly, June 1997), [http://www.ncgia.buffalo.edu/ncgia/gishist/bar\\_harbor.html](http://www.ncgia.buffalo.edu/ncgia/gishist/bar_harbor.html).

last updated—by the admission of its own footer—on August 28, 1997.<sup>33</sup>

Giving McHarg pride of place in such histories ties the history of GIS to a distinctive period of American environmentalism which saw the rapid metabolism and co-optation of New Left environmentalism by federal bureaucracies and think tanks developing new ways to tinker with the status quo. These connections will be explored in more detail below. It also places GIS prospectively at the edge a world-made-better; positions the GISciences as an environmental healing practice; and suggests that, beyond simple acts of description, it is by knowing the world—and knowing it better—that threatening environmental futures might be headed off at the pass.

As suggested above, one cannot begin to inquire after McHarg's role in the development of GIS without acknowledging that even to entertain this framing is to lend credibility to a patent historical falsehood. The classic refutation of McHarg's paternity is a 1976 paper by Carl Steinitz, Paul Parker, and Lawrie Jordan that aimed squarely at McHarg's self-inflationary arguments.<sup>34</sup> Contra McHarg, this piece reminds us that the overlay already had a distinguished career as one very few methodological orthodoxies in the landscape design disciplines, traceable at least as far as Warren Manning's 1912 transportation and land use study for Billerica, Massachusetts.<sup>35</sup>

By the mid-1920s, the authors locate yet more overlay processes. These include the

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<sup>33</sup>"Other Sites to Study," *The GIS History Project*, August 29, 1997, [http://www.ncgia.buffalo.edu/ncgia/gishist/other\\_sites.html](http://www.ncgia.buffalo.edu/ncgia/gishist/other_sites.html).

<sup>34</sup>Steinitz, Parker, and Jordan, "Hand-Drawn Overlays: Their History and Prospective Uses."

<sup>35</sup>Warren H. Manning, "The Billerica Town Plan," *Landscape Architecture* 3, no. 3 (1913): 108–18, <https://www.jstor.org/stable/44694816>; I confess that I have never found the Steinitz et al.'s argument convincing on this front. Steinitz et al. argue that "although no direct mention is made of actually employing an overlay technique" in the Billerica study, we can accept the fact that "the *Landscape Architecture* article does discuss soil and vegetation information ... together with topography" as evidence that there "is little doubt that Manning combined and analyzed the ... data ... through an overlay process" Steinitz, Parker, and Jordan, "Hand-Drawn Overlays: Their History and Prospective Uses," 445.

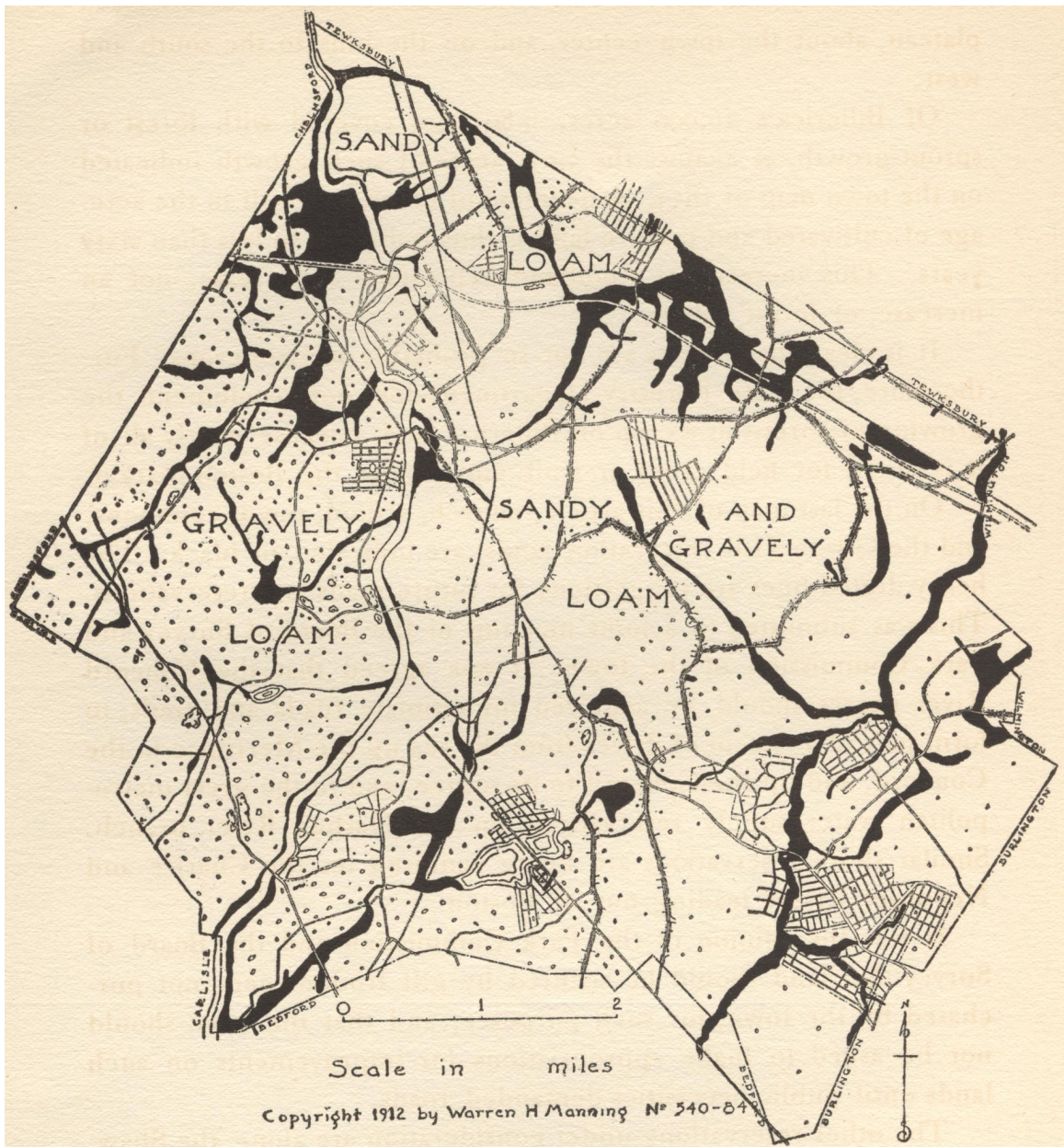


Figure 2.2: 'General soil map', from Manning's "Billerica Town Plan", Landscape Architecture 1913.

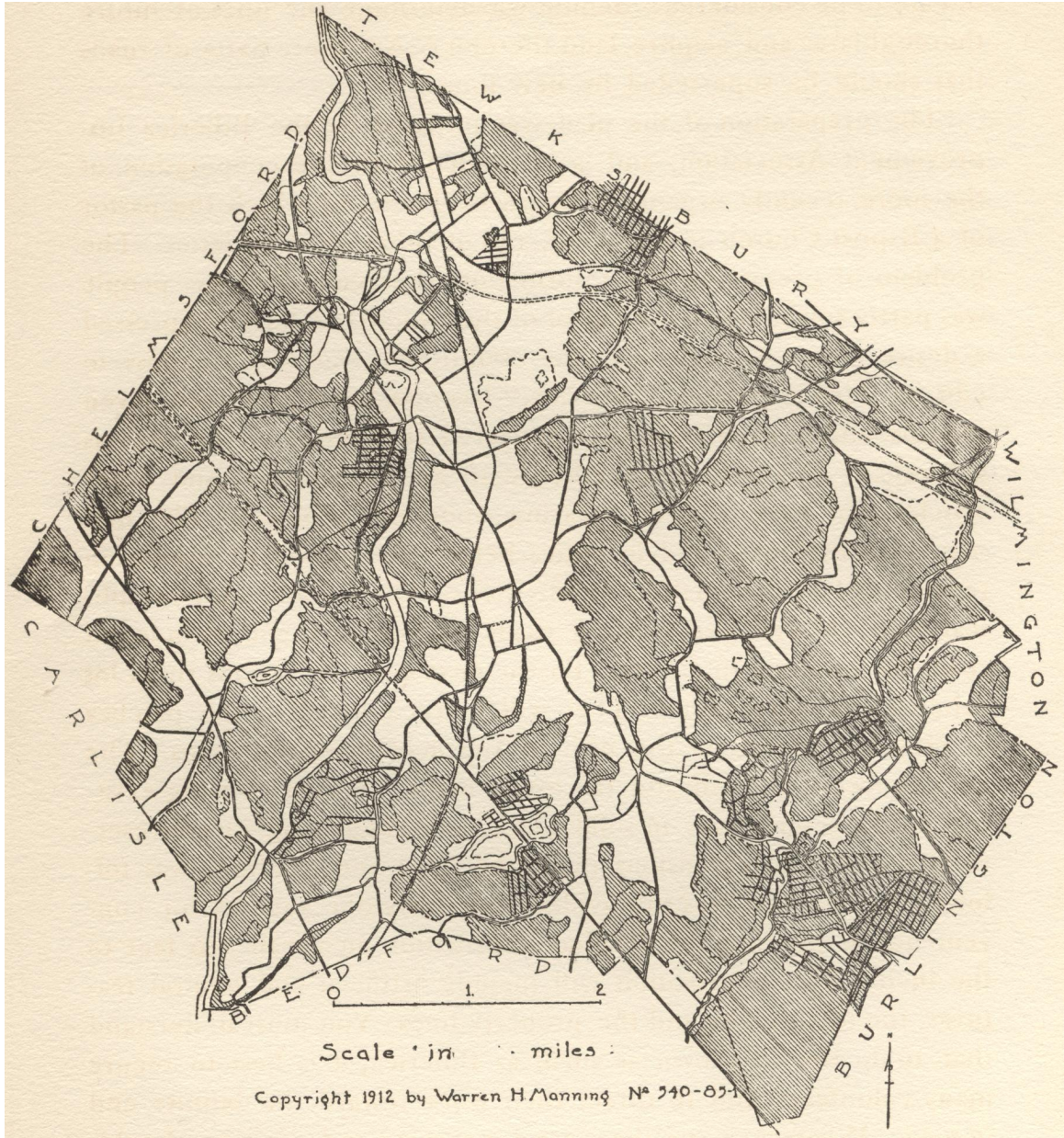


Figure 2.3: 'Forest map', from Manning's "Billerica Town Plan," Landscape Architecture, 1913.

Regional Plan Association's well-known *Regional Survey of New York and its Environs*.<sup>36</sup> Since Steinitz et al., a number of other historical arguments have taken alternative routes through precedent. Margot Lystra<sup>37</sup> has suggested that Wallace McHarg's famous highway siting study for Princeton, New Jersey, discussed above lifted freely from a very similar 1962 study conducted in by Christopher Alexander and Marvin Manheim.<sup>38</sup> Ironically, Lystra notes that where Alexander and Mannheim were explicitly dealing with computer decision-making and Wallace McHarg with analog maps, the former adhered to hand-drawing conventions that were far more interpretable than McHarg's tightly bounded polygonal cutouts.

As a final counter-example, Susan Harrington follows Steinitz et al. in offering as precedent the pedagogical work of Jacqueline Tyrwhitt, whose *Town and County Planning Textbook* of 1950<sup>39</sup> was a major innovation in planning education. Tyrwhitt was a urban designer at the Harvard Graduate School of Design (GSD) that Eleanor Shoshkes has called a 'founding mother' of the discipline,<sup>40</sup> a figure who was well-known to McHarg. They corresponded in the 1960s around the Urban Design conferences hosted annually at the GSD; she was on faculty at the Harvard Graduate School of Design during McHarg's years at that institution; she had written the introduction to the 1949 edition of Patrick Geddes's *Cities in Evolution*,

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<sup>36</sup>Thomas Adams, Harold Lewis, and Theodore McCrosky, *Regional Survey of New York and Its Environs*, vols. II: Population, Land Values, and Government (New York, 1929); The equivalence drawn between McHarg's survey method and the 'planning support'-esque gradualism of the RPA would doubtless have incensed McHarg. After all, his mentor Mumford had called the *Regional Survey* "a badly conceived pudding," "indigestible and tasteless", specifically constructed to "[pay] its cooks," quoted in Hall, *Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century*, 176

<sup>37</sup>"Drawing Natures: US Highway Location, Representational Techniques and the Rise of Ecological Design."

<sup>38</sup>Christopher Alexander and Marvin L. Manheim, *The Use of Diagrams in Highway Route Location: An Experiment* (Cambridge, MA: School of Engineering, Massachusetts Institute of Technology, 1962).

<sup>39</sup>Jaqueline Tyrwhitt, "Society and Environment: A Historical Review," in *Town and County Planning Textbook*, ed. APRR (London, UK: The Architectural Press, 1950), 96–145.

<sup>40</sup>Ellen Shoshkes, "Jaqueline Tyrwhitt: A Founding Mother of Modern Urban Design," *Planning Perspectives* 21, no. 2 (2006): 179–97, doi:10.1080/02665430600555339.



who, through Lewis Mumford, had been formative for McHarg. Indeed, Geddes himself had laid out a vision for synthetic knowledge in the planning process, arranged sectionally instead of vertically.

By [means of a valley section], our dispersive and unrelated specialisms can be co-ordinated towards a synthetic vision and a unified evolutionary understanding, region by region. Similarly our multifarious division of labor can thus be harmonised and orchestrated towards the common weal. By such surveys both the naturalistic and the humanistic origins of each region are searched out, with accordingly a better interpretation of each in the present. Thus we are able to perceive a number of possibilities, among which we have to search out the best. The movement thus extends to the largest possible scope and aims—synthetic, synergic, and sympathetic.<sup>41</sup>

Furthermore, synergistic scopes and aims had much to do with the cultivation of a certain kind of citizenship; for planners, including McHarg, extending back to Geddes, the construction of a world model was an ethical exercise in world-building.

In short, our geographic and historic surveys are increasingly yielding us a philosophy, an ethics, and policy of social life, in which all that is best in the various divergent schools of thought and action may increasingly work together.<sup>42</sup>

While listing many counter-examples may veer into the pedantic, I enumerate them to establish a baseline; McHarg did not invent overlay methods. As Anne Whiston Spirn has

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<sup>41</sup>Patrick Geddes, *Cities in Evolution* (London, UK: Williams & Norgate, 1949), xxvii.

<sup>42</sup>*Ibid.*, xxviii.

pointed out “the desire to be seen as original is typical of landscape architects, who fail repeatedly to build on prior efforts and often reiterate ideas without advancing them significantly.”<sup>43</sup>

However, I don’t make this case to diminish the McHarg’s importance to GIScience, but to treat it realistically. To point out a historical inaccuracy in a discipline’s account of itself is not to invalidate the story. To the contrary: the preponderance of references to McHarg in a technical discipline to which he made very few technical contributions (and to which he was a very late arrival) makes empirical work all the more necessary; at the very least, we must examine how McHarg’s name came to be synonymous with the ‘overlay paradigm,’ especially because he was only latterly involved in GIS qua GIS. Wilson, here, is my guide; in his *New Lines*, Wilson calls for a kind of restless social history that is

resolutely situated in the disciplinary histories that encircle GIScience, to recognize that the GISciences are not hermetically sealed, that they emerge from within specific traditions of innovation and investment. The significance of this social history is a remnant of the original GIS & Society agenda—lost in the fog of GIScience rhetoric.<sup>44</sup>

In what follows, I elaborate on the period during which McHarg elaborated one approach to environmental knowledge—the overlay method—and proposed it as a model of knowledge accumulation through an aesthetic figuration—the layer. Furthermore, I suggest that such figurations—metaphors for the accretion of knowledge—are active. They give permis-

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<sup>43</sup>Spirn, “Ian McHarg, Landscape Architecture, and Environmentalism: Ideas and Methods in Context,” 102.

<sup>44</sup>Matthew W. Wilson, *New Lines: Critical GIS and the Trouble of the Map* (Minneapolis, MN: University of Minnesota Press, 2017), 8.

sion to certain actions, make cases for others, and do so rhetorically and aesthetically. The form of knowledge has much to do with its perceived coherence.

This is also a substantial contribution to histories of GIS. Disciplinary histories are the results of interest, innovation, and investment. I ask after a specific extra-disciplinary history to understand, if not the technical means through which the ‘layer’ became implemented in GIS, than the socio-technical milieu from which it ascended. Namely, I place McHarg’s epistemic aesthetic within a mid-century American environmentalism that valued a specific type of inter-disciplinary science and deemed that type of inter-disciplinarity coherent. In doing so, I argue that McHarg’s ‘layer’ is not only a technical question of implementation, but an aesthetic question of knowledge assembly.

## 2.2 LAYER

McHarg’s epistemic aesthetic was formalized in response to a concern frequently articulated in the mid-20<sup>th</sup>-century. Namely, that forms of scientific inquiry had lost their ingratiating potential; that investigation (and scientific subjectivity) had become atomized, alienated, and subject to use by the engines of atrocity. This was a fear that spanned philosophical traditions; Hannah Arendt,<sup>45</sup> the Frankfurt School,<sup>46</sup> and Lewis Mumford<sup>47</sup> were unified in the belief that specialization and the bureaucratization of knowledge had contributed to a

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<sup>45</sup>Hannah Arendt, *Eichmann in Jerusalem: A Report on the Banality of Evil* (1963; repr., London, UK: Penguin Books, 2006); Hannah Arendt, *The Origins of Totalitarianism* (1951; repr., Orlando, FL: Harcourt, Brace, Jovanovich, 1973).

<sup>46</sup>Theodor W. Adorno and Max Horkheimer, *Dialectic of Enlightenment* (1947; repr., Stanford, CA: Stanford University Press, 2007); Herbert Marcuse, “The Problem of Social Change in the Technological Society,” in *Symposium on Social Development* (Paris, FR: United Nations Educational, Scientific, and Cultural Organization, 1961); Herbert Marcuse, *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society* (1964; repr., London, UK: Routledge, 2002).

<sup>47</sup>*Technics and Civilization* (New York, NY: Harcourt, Brace and Company, 1934); *Technics and Human Development*, *The Myth of the Machine 1* (New York, NY: Harcourt Brace Jovanovich, 1967); *Pentagon of Power*, *The Myth of the Machine 2* (New York, NY: Harcourt Brace Jovanovich, 1970).

laundry list of social ills that found their grossest expression in holocaust and mushroom clouds.<sup>48</sup>

But it was not only the critics. Scientists, including George Wald and Harlow Shapley, were also becoming vocal critics of amoral science.<sup>49</sup> McHarg was of this era that demonized specialization, and remained so throughout his career. As he says in a 1981 address to the National Science Foundation (NSF), the major institutes that underwrite the production of knowledge give “dignity and approbation to people as a function of the level of abstraction”; they bestow honors and funding upon scientists who are “concerned with atomic power particles so you can attack the gonads of the world [...] If you’re concerned with submolecular biology, molecular biology and you couldn’t recognize an organism with a fucking label on it, you get great approbation, but if you’re concerned with the human condition, you know that you have dirty fingernails, you speak with a very bad accent, and you certainly shouldn’t get government support.”<sup>50</sup>

### 2.3 SECULAR ECOTHEOLOGY IN PUBLIC

Indeed, McHarg often had occasion to was exploring unconventional venues to present theories of human inquiry (and critiques of its baseline assumptions) to broader publics. The success and breadth of a course that he developed at the University of Pennsylvania called

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<sup>48</sup>For an account of how this discourse became techno-utopian, see Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago, IL: University of Chicago Press, 2006).

<sup>49</sup>Paul M. Kennedy, “Shapley Predicts Extinction of Man If Wars Continue, Suggests Control of Genius to Insure Peace,” *The Boston Globe*, December 30, 1946; George Wald, “A Generation in Search of a Future,” *The Boston Globe*, March 8, 1969.

<sup>50</sup>Ian L. McHarg, “Proposal for a National Environmental Lab,” 1981, 109 II.C.82 Proposal for a National Environmental Lab, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA; here we benefit from an unedited transcript, rather than the version of this address that was published in Mark T. Brown and Howard T. Odum, eds., *Research Needs for a Basic Science of the System of Humanity and Nature and Appropriate Technology for the Future* (Gainesville: University of Florida, 1981), <https://ufdc.ufl.edu/UF00016639/00001/113j>.

“Man [sic] and Environment” led to an invitation by George Dessert of CBS Philadelphia to produce it as a television show. McHarg interviewed natural scientists and representatives of the religious traditions that inform the epistemology and ethics of the colonizer nations; in this way, a landscape architect was permitted to elaborate a sort of secular ecotheology in public.

Much of this was constructed along the lines of the thesis most famously articulated by the historian and Christian apologist Lynn White—that Jewish and Christian theology, taking Genesis 1:28 with deathly seriousness<sup>51</sup>, had imparted to the Western order license to treat the non-human world as an endlessly exploitable resource.<sup>52</sup> This thesis has been subject to endless debate; for the curious, Elspeth Whitney provides a concise summary in *History Compass*.<sup>53</sup> I raise it to place McHarg within his milieu—equally suspicious of atomized science and of inherited ethics. This explains the preponderance of religious figures in the programming of this world. There were interlocutors from Jewish, Christian, and Catholic traditions, though these tended to get collapsed into a single monolithic vision of ‘Judeo-Christian’ values.<sup>54</sup> Rabbi Joshua Heschel, the widely-read scholar of Jewish ethics and hasidism, made an appearance, as did the equally influential Lutheran theologian Paul Tillich. The Jesuit theologian Father Gustave Weigel—translator of Protestant and Jewish concerns into the Catholic ecumenical movement—came by. These were assembled largely as a anthropocentric foil to ecology’s stewardship humanism. McHarg recalls later that “the

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<sup>51</sup>“Be fertile and increase, fill the earth and master it; and rule the fish of the sea, the birds of the sky, and all the living things that creep on earth” Adele Berlin and Marc Zvi Brettler, eds., *The Jewish Study Bible*, 2nd ed. (New York, NY: Jewish Publication Society, Oxford University press, 2014), 12

<sup>52</sup>L. White, “The Historical Roots of Our Ecologic Crisis,” *Science* 155, no. 3767 (March 10, 1967): 1203–7, doi:10.1126/science.155.3767.1203.

<sup>53</sup>Elspeth Whitney, “Lynn White Jr.’s ‘the Historical Roots of Our Ecologic Crisis’ After 50 Years,” *History Compass* 13, no. 8 (2015): 396–410, doi:10.1111/hic3.12254.

<sup>54</sup>For a discussion of the role of this term in flattening the civic religion of liberal democracy, see K. Healan Gaston, *Imagining Judeo-Christian America* (Chicago, IL: University of Chicago Press, 2019).

spokesman were famous, venerable, gentle, and mostly unhelpful. [Heschel, Weigel, and Tillich] presented the anthropocentric, anthropomorphic view in Judaism and Christianity with neither conviction nor persuasion. ... The answers did not lie there.”<sup>55</sup>

At the same time as these were criticized, the implications (and political commitments) of the show’s natural-scientific guests were simply assumed away. Many of the voices present were those of the ignominious early environmentalists whose environmental consciousness was accompanied by troubling convictions regarding who was to blame. These went largely unexamined; Henry Fairfield Osborne, Jr., neo-Malthusian author of *Our Plundered Planet*, who some have credited with lending new popular credibility to population control discourses.<sup>56</sup> He was also a conservationist, and first president of the Conservation Foundation, which was key to the success of McHarg’s early success. Similarly, the British biologist Sir Julian Huxley appeared, who was a dedicated and unrepentant eugenicist, having as President of the British Eugenics Society well after the broad disavowal of the movement that followed World War II (1959-1962)—this goes unexamined. The Harvard astronomer Harlow Shapley, another guest, was hardly scientific: in his inaugural address to the American Association for the Advancement of Science in 1947, Shapley warns of the day that...

one of the inevitable super-geniuses of the future discovers some new mankind-annihilating device, and this genius is insane—perhaps undetectably insane—he will willingly perish as he murders the rest. There will be no survivors. ... The control of the genius, who might take the species to the grave with him, is too easy. All you need to do is to kill off, while young, all primates that show any

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<sup>55</sup>Ian L. McHarg, *A Quest for Life: An Autobiography* (New York, NY: John Wiley & Sons, 1996), 164.

<sup>56</sup>*Our Plundered Planet* (Boston, MA: Little, Brown and Co., 1968).

evidence of promise of genius or even of talent. Heroic measures, to be sure, buy because of the tricks in that abominable human cortex, it may be your only way to save the species for 100,000 years.<sup>57</sup>

In this same address, he notes that “civilization is endangered by strong physics and weak sociology.”<sup>58</sup> But of course, it is not difficult to see how scientism mixed with a cavalier attitude towards human life, mixed with scientific elitism to produce a hybrid immobilizing ecological nihilism.^[The Hindu teacher Swami Nikhilananda, founder of New York’s Ramakrishna-Vivekananda Center, was given an episode, as was the Frankfurt School-affiliated psychoanalyst Erich Fromm. He also interviewed planner and regional scientist William L. C. Wheaton. Wheaton had administered the doctoral program in Regional Science at the University of Pennsylvania alongside Walter Isard. It was through Wheaton and Britton Harris that regional science developed a close relationship to urban planning at Penn.<sup>59</sup>

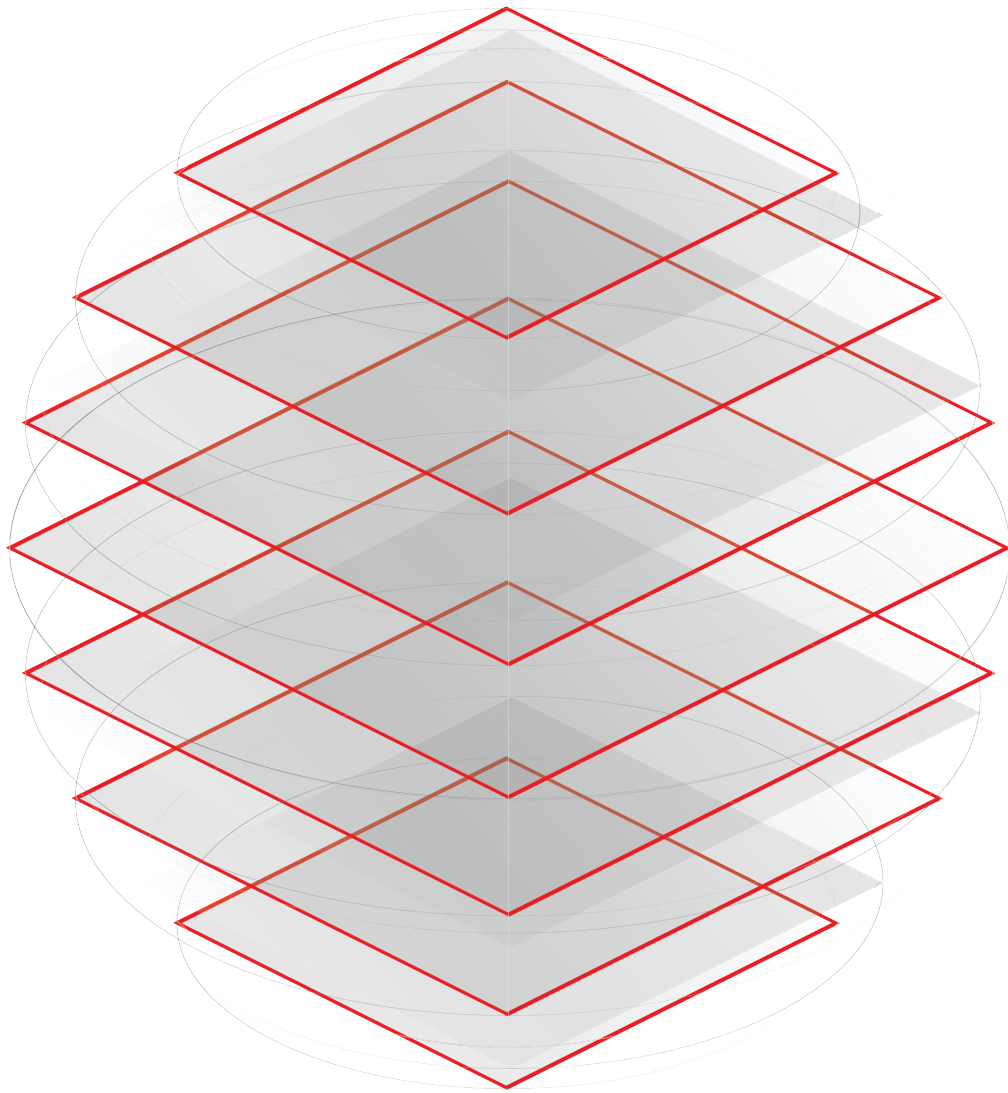
McHarg’s solution to mid-century scientific pessimism was to reconstruct his discipline—modeled in an academic department—along lines generally precluded by the structure of academic inquiry. Between 1960 and 1980, the University of Pennsylvania Department of Landscape Architecture and Regional Planning, which McHarg had founded in 1955, launched a very unusual experiment in radical interdisciplinarity with support from many

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<sup>57</sup>Kennedy, “Shapley Predicts Extinction of Man If Wars Continue, Suggests Control of Genius to Insure Peace,” 1.

<sup>58</sup>“Survival of Man Assured,” *Science Newsletter*, January 4, 1947, <https://archive.org/details/in.ernet.dli.2015.27154/>.

<sup>59</sup>Ethan Schrum, *The Instrumental University: Education in Service of the National Agenda After World War II* (Ithaca, NY: Cornell University Press, 2019) Wheaton was influential in the growing discipline, and immediately succeeded Bill Garrison as President of the Regional Science Association in 1963-1964 Walter Isard, *History of Regional Science and the Regional Science Association International* (Berlin, DE: Springer, 2003). Wheaton would be one of the architects of American urban renewal policy as Special Assistant to the Administrator of U.S. Housing and Home Finance Agency UC System Academic Senate, “1980, University of California: In Memoriam,” 1980, University Archives, The Bancroft Library, University of California at Berkeley, Berkeley, CA, <http://content.cdlib.org/view?docId=hb1j49n6pv>.



*Figure 2.4: Layering is the attainment of a unified image of a site or region by assembling forms of knowledge. Graphic by Eric Robsky Huntley.*

of the cornerstones of the emerging environmental establishment: the Conservation Foundation, the Ford Foundation, and the National Institutes of Mental Health (NIMH). With the financial support of these groups, the GSFA would build a institution consistent with an idiosyncratic model of holistic knowledge: knowledge imagined as cartography, assembled through practices of layering (see 2.4).

The specific process of knowledge assembly will be outlined in greater detail below.



McHarg's theory and his methods have been scrutinized at great length; I will not rehearse these criticisms here.<sup>60</sup> Instead, I focus on MchHarg's epistemic aesthetic approach to the problem of planning: namely, the means through which he enacted an integrative form of knowledge through *layers* of disciplinary knowledge.

McHarg's assessment is that fragmentation had precluded the production of knowledge sufficiently synthetic to be used by planners imagining responses to threatening environmental futures.

Our job is to reconstitute the region and all its processes again, like putting together Humpty Dumpty. ... This is what modern science is: the egg is shattered, all the fragments lie scattered on the ground. The fragments are called geology and physics and chemistry and hydrology and soil science, plant ecology, animal ecology, molecular biology, and political science. ... Science and university departments are devices by which integration is all but impossible. ... Obviously, one must be emasculated and myopic in order to be a pure, successful scientist. ... Holism therefore is extremely difficult.<sup>61</sup>

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<sup>60</sup>For a critical study of his scientific theory, in general, see Susan Herrington, "The Nature of Ian MchHarg's Science," *Landscape Journal* 29, no. 1 (2010): 1–10, [www.jstor.org/stable/43323861](http://www.jstor.org/stable/43323861). For a contextual analysis of the same see Spirn, "Ian MchHarg, Landscape Architecture, and Environmentalism: Ideas and Methods in Context." For a study placing his work in conversation with his periodic interlocutor Carl Steinitz, see Moa Karolina Carlsson, "Environmental Design, Systems Thinking, and Human Agency: MchHarg's Ecological Method and Steinitz and Rogers's Interdisciplinary Education Experiment," *Landscape Journal* 36, no. 2 (2017): 37–52, doi:10.3368/lj.36.2.37. Margot Lystra treats the reader to a study unusually attuned to praxiographics in Margot Lystra, "MchHarg's Entropy, Halprin's Chance: Representations of Cybernetic Change in 1960s Landscape Architecture," *Studies in the History of Gardens & Designed Landscapes* 34, no. 1 (2014): 71–84, doi:10.1080/14601176.2013.850313 and Lystra, "Drawing Natures: US Highway Location, Representational Techniques and the Rise of Ecological Design." For commendably reflexive studies from the Director of the new Ian MchHarg center for Landscape and Urbanism, see Billy Fleming, "Design and the Green New Deal," *Places Journal*, April 16, 2019, <https://placesjournal.org/article/design-and-the-green-new-deal/>; Billy Fleming, "50 Years Later, Ian MchHarg's Ideas Still Define Landscape Architecture," *Metropolis*, June 18, 2019, <https://www.metropolismag.com/cities/mchHarg-design-with-nature-50th-anniversary/>

<sup>61</sup>MchHarg, "Theory of Creative Fitting."

‘Holism,’ for McHarg, was possible to imagine procedurally through combinations of academic expertise. He referred to himself as a “quasi-crypto-pseudo scientist”<sup>62</sup>, and therefore a scientific subject requiring simplicity. “I will not open my stupid mouth until I am advised by people who do know [about the region of study].”

And people who do know were meant to speak in a very specific order. The geologist is expected to reveal “a billion years of evidence,” the “oldest, best, longest evidence.” Following the geologist comes the meteorologist, who “identifies every single piece of information about the climate of the region.” Subsequent investigation is carried out by the geomorphologist, who, due to specialization, is often made in situ through the combination of two separate scientists: the bedrock geologist and the surficial geologist. These scientists produce a composite picture of the active life of regional rocks (and the climatic forces involved in their shape); as such, water, whose meanders are shaped by and give shape to geology, becomes characterizable in terms of causes. Groundwater hydrologists and surface water hydrologists tell of waters above and below, in collaboration with a physical geographer capable of explaining physiography. Physiography begs the questions of soil science: what is the composition of the loams and silts deposited and causally determined by the shape of the land? And what plants can grow in these soils so-composed, determining their ranges? Clearly, a plant ecologist will know, and know well. Plants, having something to do with the locational tendencies of animalia, can then inform the animal ecologist who carries out their work of identifying habitats.

Each of these disciplines is rendered cartographically as a layer, one component of an integrated image of a region’s natural history. These layers are subject to stacking, producing

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<sup>62</sup>Ibid.

a single map intended to inform—indeed, to determine—the shape of human settlement. This produces a beautiful, blotchy cartography submitted as persuasive evidence in support of necessary action. There are subsequent phases of course; in an ideal project, as described, there is iteration in which the co-constitution of these factors is analyzed from the standpoint of a process analytic. The ethnic composition of human settlements tells the researcher about their history, fallaciously deriving settlement traits from qualities determined ethnically.<sup>63</sup> These strenuous efforts were in the service of a complete, systemic model of a site or region, which permits the worst of the human to be regulated.

Even during McHarg's most prolific and visible period (approximately 1965-1979), McHarg was seen by others in his discipline as a more credible polemicist than methodologist. Carl Steinitz at the Landscape Architecture Research Office (LARO) of the Harvard Graduate School of Design (GSD) conducted a comparative analysis of landscape planning approaches, including McHarg's.<sup>64</sup> Their appraisal was not especially kind, suggesting that McHarg's method confuses *inventory* with *evaluation*. In other words, McHarg failed to distinguish between representation and interpretation.<sup>65</sup>

Michael Laurie, reviewing the paperback edition of *Design with Nature* in 1971, titles his piece "Scoring McHarg: Low on method, high on values."<sup>66</sup> This is generally a positive

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<sup>63</sup>See Jeremy W. Crampton, "Rethinking Maps and Identity: Choropleths, Clines, and Biopolitics," in *Rethinking Maps* (London, UK: Routledge, 2011), doi:10.4324/9780203876848-8 on the history of ethnic mapping.

<sup>64</sup>Catherine McMahon presents a marvelous study of this document, and the LARO itself, in her master's thesis of 2009, "Between Nature and Artifice: The Landscape Architecture Research Office (1966-1979)" (Master's Thesis, Massachusetts Institute of Technology, 2009), <http://dspace.mit.edu/handle/1721.1/49726>. Portions of this work were subsequently published as Catherine F. McMahon, "Predictive Machines: Data, Computer Maps, and Simulation," in *A Second Modernism: MIT, Architecture, and the "Techno-Social" Moment*, ed. Arindam Dutta (Cambridge: The MIT Press, 2013), 436–73.

<sup>65</sup>Carl Steinitz et al., "A Comparative Study of Resource Analysis Methods" (Cambridge, MA: Department of Landscape Architecture Research Office, 1969).

<sup>66</sup>Michael Laurie, "Scoring McHarg: Low on Method, High on Values," *Landscape Architecture* 61, no. 3 (1971): 206, 248.

review, and an illuminating one. McHarg's method is described as incomplete by virtue of its deliberate exclusion of the social world from its technique. However, this is deemed beside the point: the text is understood to be an object of persuasive rhetoric rather than a demonstration of rigor. In Laurie's words, "it is a technique of persuasion to give emphasis to sorely neglected environmental factors and resources in the planing process."<sup>67</sup> Given this early reception (and the broad forgiveness of the text's deficiencies in light of its polemical tenor) it is a strange fact of intellectual history that it morphed over the next 15 years into an almost scriptural methodological text within the landscape profession, and a forebear of GIS. A wry assessment of the same text a little more than a decade later asks: "are we really designing with nature or are we simply addicted to our maps and the technology behind them?"<sup>68</sup>

I am less interested in critiques of McHarg's method than I am interested in the operative metaphors of his practice, and how these came to matter to GIS practitioners. I arrive at two such metaphors: the layer and the globe. The layer is an epistemic aspiration that drives the disciple towards complete models of a bounded site. This figuration is the subject of this chapter. The globe is also an epistemic aspiration, but one whose aspirants are pulled towards the horizontal totality of the earth. These two aspirations sit in tension in scientific subjects who dream of, on the one hand, 'knowing everything about...' and, on the other hand, 'knowing everywhere...'

Francis Harvey drew my eye to this tension. He points to two separate and contradictory trajectories in the development of geographic information systems, which he distills as

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<sup>67</sup>Ibid., 206.

<sup>68</sup>Joseph Dunstan, "Design with Nature: 14 Years Later," *Landscape Architecture* 73, no. 1 (1983): 61 cited in Herrington, "The Nature of Ian McHarg's Science," 11.

follows:

How can the holism of the ‘totality of relationships’ be maintained in a system of separate horizontal and vertical relationships?<sup>69</sup>

He isolates two related moves here. First, the aspiration to holistic totality—cosmos—and the aspiration to complete descriptions—systems. He suggests that the eventual arrival of GIS as a more-or-less permanent resident in the ‘systems’ camp can be associated with the movement of geographic thought in general. If GIS has, to some degree, tamed (or abandoned) its aspiration towards cosmographic holism, it has as its compatriot geographic writ large.

I find myself in agreement with Harvey: that models of holism wax and wane. I also find much to work with in his isolation of two forms of holism. I take these forms and give them names more directly applicable to forms of representation enabled by GIS. Holistic totality I dub the globe. And systemic description I dub the layer. I find that these epistemic aesthetics, when played out disciplinarily, have much to do with the changing institutional priorities that carry inquiry forwards. The de-mattering of geographic inquiry—which takes place across more than one discipline!—has as much to do with the impracticability (and rhetorical failure!) of both layers and globes, as enacted, despite their persistent appeal.

For at least these reasons of rhetoric, the evaluation of disciplinary change on epistemic grounds is not sufficient to understand the relative practicability of the layer and the globe. While changing standards of scientific inquiry and its patronage certainly had a great deal to do with the fate of holism in the second half of the 20th century, I argue that the *aes-*

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<sup>69</sup>Francis Harvey, “From Geographic Holism to Geographic Information System,” *The Professional Geographer* 49, no. 1 (1997): 77, doi:10.1111/0033-0124.00058.

*thetic* evaluation of holism's wholeness also played a role. In presenting forms of evidence, both geographers and landscape architects failed to persuade their publics of the validity of their forms of inquiry. This is due not only to evidence, but to changing standards for the coherence of evidence.

In formulating my response to the aesthetics of evidence, I think alongside Jenny Rice, who has recently presented an argument that conjoins epistemology and aesthetics through a consideration of 'magnitude,' in the Aristotelian sense of *megethos*.<sup>70</sup> For Rice, evidence is not simply accumulated, but also curated, culled, combed, massaged. In formulating truth claims, too much evidence can appear incoherent, just as too little evidence appears insufficient.

In Aristotle's description, the aesthetics surrounding magnitude mark a kind of coherence, or a feeling of "taking in" what is sometimes translated as a "sense of the whole." This particular translation renders Aristotelian beauty less an epistemic concept of unity and more a sense impression of wholeness.<sup>71</sup>

Wholeness is the aesthetic correlate of unity, and it has as much to do with the aesthetic art of making evidence coherent as it does with the epistemic practice of collection. In the moment of argument, when knowledge is subjected to the scrutiny of its publics, the sensory experience of that argument's wholeness matters. It matters in the sense that the answer to the question, "do we buy this?" may be determined on aesthetic, not epistemic, grounds. While Rice's theorization turns on an analysis of conspiracy discourse,<sup>72</sup> mine turns on an

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<sup>70</sup>Jenny Rice, "The Rhetorical Aesthetics of More: On Archival Magnitude," *Philosophy & Rhetoric* 50, no. 1 (2017): 26, doi:10.5325/philrhet.50.1.0026.

<sup>71</sup>Ibid., 32.

<sup>72</sup>Rice, *Awful Archives: Conspiracy Theory, Rhetoric, and Acts of Evidence*.

analysis of the planning and design disciplines, where maps function rhetorically to convince their publics of their coherence and validity. To persuade, to affect, to effect, is to invoke a particular distribution of the sensible (to invoke Rancière's language<sup>73</sup>)—one deemed 'just right' in a specific speech setting.

What I identify as the 'layer' is an epistemic aesthetic: a form of wholeness that functions rhetorically to convince a public of its factuality. Taken in this way, representations borne of geographic inquiry are active. Epistemology is not merely 'knowing what,' it is 'proposing that.' I propose that this propositional element is lost in many of the source texts that narrate the epistemic anxiety of the humanities and social sciences after the crisis of representation. Indeed: that what I call 'ought anxiety' compels our thought to think differently. Away from the anxiety of anticipating the partiality of our perspective or the fragility of our representations, and towards an anxiety that anticipates the possible failure of our representations to convince, even in the presence of a consensus as to their factuality.

#### 2.4 ALL EPISTEMOLOGY BEGINS IN FEAR...

The past forty-odd years of scholarship in the social sciences and humanities have been nothing if not discomfiting, wracked by 'crises' and 'anxieties.' (Not to mention 'turns!') Crises of representation, Cartesian anxieties, cartographic anxieties, cartographic-cartesian anxieties, epistemological anxieties, and positional anxieties have employed a boom town's worth of surveyors of disorientation, madness, the ungoverned, the ungovernable, metaphors of insanity and difficulty, trouble and instability. Anxiety about what is known and what is unknowable. Anxiety about insides and outsides, Othering, and subjectification, all con-

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<sup>73</sup>Rancière, *The Politics of Aesthetics: The Distribution of the Sensible*.

tributing to an academic landscape in which contingency and nuance are the metafindings de jour.<sup>74</sup> It remains uncontroversial to say that our collective stomachache is due to the coming-apart of conventionally figured, representational knowledge.

Daston and Galison, for example, can't help but notice that scientists are frequently moralistic animals.<sup>75</sup> Scientific practice, despite its reputable objectivity, involves doing a great deal of work on the self. In developing their history of objectivity, they note that

All epistemology begins in fear—fear that the world is too labyrinthine to be threaded by reason; fear that the senses are too feeble and the intellect too frail; fear that memory fades, even between adjacent steps of a mathematical demonstration; fear that authority and convention blind; fear that God may keep secrets or demons deceive. Objectivity is a chapter in this history of intellectual fear, of errors anxiously anticipated and precautions taken.<sup>76</sup>

Responding to this complex of anxieties, then, is necessarily ethical; the cultivation of an ethos requires the cultivation of specific epistemic virtues. Faithfulness to the object of inquiry requires that certain parts of the self be made subservient to the will. Daston and Galison provide a window into the history of science from the vantage point of the present; after decades of 'anxieties' rehearsed and promulgated in the humanities and social sciences, it becomes difficult to imagine any historical moment passing without its corresponding anxieties regarding its knowledge practices.

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<sup>74</sup>Kieran Healy, "Fuck Nuance," *Sociological Theory* 35, no. 2 (2017): 118–27, doi:10.1177/0735275117709046.

<sup>75</sup>*Objectivity*.

<sup>76</sup>372.



I argue, though, that even as knowledge games are productively analyzed through the lens of anxiety, such analyses are of limited utility for conceptualizing the affective life of knowledge in disciplines whose products are prescriptive, not descriptive. If all epistemology begins in fear, pragmatics might have their own set of anxieties that have less to do with what is and more to do with the inadequacy of even the strongest 'is' statements to effect material change. If persuasion is partially aesthetic and prone to failure on these grounds, planners, designers, and others concerned with 'ought' statements must experience anxieties that also demand specific training regimens. I call this 'ought anxiety', and propose that in the work of McHarg, we see the layer and the globe deployed in response.

Anxiety According to...?

In drawing out these forms of anxiety, and theorizing my own, I must make explicit my relationship to 'anxiety' as a conceptual tool. I am not, here, invoking the long lineage of psychoanalysis or sitting the shadow of Lacan. The same can be said for all of the literature on anxiety that I discuss here, except where explicitly noted; this body of work neglects to engage meaningfully with clinical literature of any stripe. For these scholars, anxiety is a concept of useful looseness, a term of practical malleability that is suitable precisely due to its familiarity.

However, the consistency of anxiety's appearance as a concept useful for understanding contemporary intellectual life produces an informal literature of its own. It is this informal, emergent literature—this broad, intellectual *doxa*—with which I engage. Furthermore, I choose to engage it on its own terms, through a rereading of its source texts, rather than offering psychoanalytic correctives. Through this deliberately naïve approach, I am aiming

to harness the conceptual utility of ‘anxiety’ without appearing to retroactively correct its past appearances in a multiplicity of venues.

One of the first theoretical physicians to diagnose the condition was Richard Bernstein, who named the irrupting trouble ‘Cartesian Anxiety’ in his *Beyond Objectivism and Relativism*.<sup>77</sup> Bernstein makes his argument by drawing on counter-currents in Descartes’s *Meditations*. While it is typical to read (and demonize) Descartes as an arch-rationalist, issuing absolutist epistemological commands from beneath the accumulated dust of centuries, Bernstein reads Descartes for affect, not for epistemology. In so doing, he finds terror, quaking uncertainty, and the feeling of threat simmering throughout the text.

A would-be knower, says Descartes, must undergo strenuous exercises in preparation for a long journey; these leave the muscles fatigued. Fatigued and aware of either their inadequacy or their absolute dependency on a metaphysical ground—God or other solids. Elsewhere, he draws on the pragmatist Pierce’s description of Cartesianism, which foregrounds that the cartesian subject begins from universal doubt and bears witness to a growing list of “facts which Cartesianism not only does not explain but renders absolutely inexplicable, unless to say ‘God made them so’ is regarded as explanation.”<sup>78</sup> In Bernstein’s telling, Descartes leaves us with a “seductive Either/Or”: either we locate the Archimedian point against which to gauge the validity of all knowledge; or we succumb to the totalizing madness that subsumes the subject that excuses their questing soul from its responsibility to locate stable ground. We either follow Kierkegaard and Derrida and take a ‘leap’ across the

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<sup>77</sup>*Beyond Objectivism and Relativism: Science, Hermeneutics, and Praxis*.

<sup>78</sup>Pierce cited in Richard J. Bernstein, “Pragmatism, Pluralism and the Healing of Wounds,” *Proceedings and Addresses of the American Philosophical Association* 63, no. 3 (1989): 7–8, <https://www.jstor.org/stable/3130079>.

chasm of the ‘undecidable,’<sup>79</sup> or sate ourselves with metaphysical comfort food.

The specter that hovers in the background of this journey is not just radical epistemological skepticism but the dread of madness and chaos where nothing is fixed, where we can neither touch bottom nor support ourselves on the surface. With a chilling clarity, Descartes leads us with an apparent and ineluctable necessity to a grand and seductive Either/or. *Either* there is some support for our being, a fixed foundation for our knowledge, *or* we cannot escape the forces of darkness that envelop with madness, with intellectual and moral chaos.<sup>80</sup>

What would motivate the aspirant to undertake such a strenuous ‘journey of the soul’? Many of the inheritors of Bernstein’s ‘anxiety’ seem to arrive at the conclusion that Descartes’s program was the attainment of knowledge. However, let us reconsider the passages that Bernstein cites as evidence for the quiver in Descartes’s voice. Descartes reminds the reader of Archimedes, who, in order to...

draw the terrestrial globe out of its place, and transport it elsewhere, demanded only that one point should be fixed and immovable.<sup>81</sup>

Examine, not the demand—the familiar call for fixity, the immobile ‘slice through time’ that characterizes representationalism<sup>82</sup>—but rather at the *rationale* for the demand. Why

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<sup>79</sup>Søren Kierkegaard, *Philosophical Fragments / Johannes Climacus*, trans. Edna H. Hong and Howard V. Hong (Princeton, NJ: Princeton University Press, 1985); Jacques Derrida, “Nietzsche and the Machine,” *Journal of Nietzsche Studies* 7 (1994): 7–66, <https://www.jstor.org/stable/20717600>; Jacques Derrida, “Force of Law: The ‘Mystical Foundation of Authority,’” in *Acts of Religion*, ed. Gil Anidjar, trans. Mary Quaintance (New York, NY: Routledge, 2001), 230–98.

<sup>80</sup>Bernstein, *Beyond Objectivism and Relativism: Science, Hermeneutics, and Praxis*, 18.

<sup>81</sup>Descartes, cited in *ibid.*, 16.

<sup>82</sup>Doreen Massey, *For Space* (Los Angeles, CA: SAGE, 2005).

demand fixity? What does fixity permit? Why demand immobility? What does immobility permit? Archimedes demands his point in space because that point is understood to be a precondition for a certain *action*: drawing the terrestrial globe out of its place and transporting it elsewhere. Fixity is not its own justification; nor is immobility. Rather, fixity and the feeling of the captured known constructs a realm of possibility, an operative field. In short: we fix, in order that we might move the world.

But the knowing subject is often obliged to move the world before identifying a fixed point, and here I attempt to distinguish between myself and early geographical interpreters of these passages (including Derek Gregory, discussed below). Action, movement, political life... matters of concern do not wait for matters of fact to assemble. To wit, Descartes notes that...

because the *exigencies of action* often oblige us to make up our minds before having leisure to examine matters carefully, we must confess that the life of man [sic] is very frequently subject to error in respect to individual objects, and we must in the end acknowledge the infirmity of our nature.<sup>83</sup>

The Cartesian subject is called to fix the world precisely because doing so constitutes an operative field that permits the formulation of an intervention. However, we become anxious anew when we begin to feel the slippage that sits between data and decision. One does not need to become fully Derridean, though, to acknowledge the jagged rock face that looms between a description and a prescription, an is and an ought. This is a classical paradox, identified by Hume, among others. Our representations do work in the world and allow

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<sup>83</sup>Descartes, cited in Bernstein, *Beyond Objectivism and Relativism: Science, Hermeneutics, and Praxis*, 17, emphasis mine.

their holders and makers to push and pull on the earth. However, they are not guaranteed to do the work we expect them to do. In short, we can understand Bernstein's 'Cartesian Anxiety' to be about epistemology—and many have—but I choose to focus on its pragmatics. What appears to be a matter of knowing is, in my telling, a matter of pragmatics; it is not coincidental that Bernstein is one of the major contemporary interpreters of the American pragmatic tradition.<sup>84</sup>

It is at this point a truism to say that reality is never a transparently accessible thing. It must be made present through practices that result in epistemic objects, affects, and materialities.<sup>85</sup> Amoore reminds us that “though the desire to act on the basis of possible futures may appear to annul and close off political decision, in fact decisions are made everywhere and all of the time. To retrieve those decisions and pry open their acute difficulties is to relocate the politics of an otherwise gleaming and technoscientific set of solutions.”<sup>86</sup> In other words, prying open the difficulty of decision is one means to recover the sense of political possibility that inheres in practices of futurity. We can look for “slippages between data and decision.”<sup>87</sup>

The anxieties articulated by Bernstein began to roil the specifically cartographic imaginary in the mid-1990s, along two separate lines of inquiry pursued by two separate authors in two separate bodies of literature. In 1994, 'cartographic anxiety' entered the lexicon.<sup>88</sup>

Emerging from scholarship on post-coloniality, Sankaran Krishna writes of the cartographic

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<sup>84</sup>Richard J. Bernstein, *The Pragmatic Turn* (Malden, MA: Polity, 2010); Bernstein, “Pragmatism, Pluralism and the Healing of Wounds.”

<sup>85</sup>Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007).

<sup>86</sup>Amoore, *The Politics of Possibility: Risk and Security Beyond Probability*, 15.

<sup>87</sup>Louise Amoore, “Data Derivatives: On the Emergence of a Security Risk Calculus for Our Times,” *Theory, Culture & Society* 28, no. 6 (2011): 11, doi:10.1177/0263276411417430.

<sup>88</sup>Painter, “Cartographic Anxiety and the Search for Regionality” suggests that despite their simultaneous coinage, these authors were unaware of each other.

metaphors used to negotiate the anxieties of post-colonial nation-state identity formation.<sup>89</sup> Where are the respective insides and the outsides of ‘former colony’ and ‘not-yet-nation’? How do the imaginative territories of these identities map onto Westphalian territories?

Simultaneously, within geography, Derek Gregory<sup>90</sup> reads recent critiques of spatial science as constitutive of what he (also) calls ‘cartographic anxiety’. For Gregory, this is what is left after “the assumptions and privileges that inhere within the world-as-exhibition have been called into question.”<sup>91</sup> As modernity’s objectified world images ceased to function as epistemological insurance, “the complexity and contingency of human spatiality” demanded a reckoning. This was bound, according to Gregory, to produce a specific constellation of anxieties for a discipline whose conceptual and technical repertoire are uniquely indebted to those images of exploration and the cognition of *terrae incognitae* that were the necessary adjuncts of the world-as-exhibition.

Gregory reads Michel Tournier’s retelling of Robinson Crusoe, *Friday*, as evocative of both the Cartesian project and its teetering. Gregory focuses on Crusoe’s rhetoric of mastery:

I demand, I insist, that everything around me shall henceforth be measured, tested, certified, mathematical, and rational. One of my tasks must be to make a full survey of the island, its distances and its contours, and incorporate all these details in an accurate surveyor’s map. I should like every plant to be labeled, every bird to be ringed, every animal to be branded.<sup>92</sup>

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<sup>89</sup>“Cartographic Anxiety: Mapping the Body Politic in India.”

<sup>90</sup>*Geographical Imaginations*.

<sup>91</sup>6.

<sup>92</sup>Michel Tournier, *Friday* (Baltimore, MD: The Johns Hopkins University Press, 1967), cited in Gregory, *Geographical Imaginations*, 14.

Gregory, though, excludes the second half of the passage from his explicit discussion, in which Crusoe identifies the ends of his inventory...

I shall not be content until this opaque and impenetrable place, filled with secret ferments and malignant stirrings, has been transformed into a calculated design, visible and intelligible to its very depths!<sup>93</sup>

An inventory is undertaken to transform the landscape from opaque monstrosity to design. Even as the imagined inventory creaks under its own weight, the fixity of representation is understood as an instrument for bringing about changes in thought. “Those fixed points which thought uses for its progression, like crossing a river on stepping stones are crumbling and vanishing beneath the surface.”<sup>94</sup> Measurements make a useful stepping stones, maps support design. Representational pragmatics are frequently the ends of Cartesian projects, a fact that came as something of a surprise to practitioners of the descriptive social sciences.

Such a pragmatic reading of maps is characteristic of ‘post-representational’ approaches to mapping and cartography. Pickles makes the first call for such an approach, with an eye to clarifying the manner in which cartography inscribes identities, produces subjectivities, and manifests material transformation on the land. For Pickles, mappings are *inscriptions*, and as such they “provide the very conditions of possibility for the worlds we inhabit and the subjects we become ... maps and mapping precede the territory they ‘represent.’”<sup>95</sup>

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<sup>93</sup>Tournier, *Friday*, cited in Gregory, *Geographical Imaginations*.

<sup>94</sup>Tournier, cited in *ibid*.

<sup>95</sup>Pickles, *A History of Spaces: Cartographic Reason, Mapping, and the Geocoded World*, 146.

What is needed then is a 'situated pragmatics of map use,' and a concomitant fixing of our attention on how maps work in particular situations.

It is ... a fundamental question of how maps work in practice: a situated pragmatics of map use that begins with the clear understanding that what the map represents and the ways in which it represents the world are not guaranteed by anything behind it. It is not a representation of the world, but an inscription that does (or sometimes does not do) work in the world.<sup>96</sup>

Wilson has also begun to explore the inscriptive character of lines. Building a hybrid theory from parts of Deleuze and Guattari as well as Gunnar Olsson, Wilson theorizes the line as both an atomic unit of geographic inquiry and a metaphor for its development. Olsson famously said, "is this geography? Of course it is! For what is geography if it is not the drawing and interpretation of lines."<sup>97</sup> In drawing out and drawing on, the geographer intervenes, and it is for this intervention that the geographer is accountable. "Maps are representations, and as such, they intervene; they leave a mark."<sup>98</sup> Lines, for Wilson, are also the product of historical moments of intense intellectual fermentation in the development of cartographic technology, which become less forceful as they are institutionalized and calcified. These bursts of intensity, these lines of flight,<sup>99</sup> are not only subject to representation: they can also be re-presented and therefore mapped, made to move, made different, disturbing, and catalyzing. I understand Wilson to be very much undergirding my own position

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<sup>96</sup>Ibid.

<sup>97</sup>Gunnar Olsson, *Lines of Power/Limits of Language* (Minneapolis, MN: University of Minnesota Press, 1991), 181.

<sup>98</sup>Wilson, *New Lines: Critical GIS and the Trouble of the Map*, 100.

<sup>99</sup>To use the language of Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi (Minneapolis, MN: University of Minnesota Press, 1987).



here: that histories of geographic, or para-geographic, thought can be active, necessary to enable new positions.

However, some have suggested that the arguments outlined above leave the map's map-ness relatively untouched. Kitchin and Dodge<sup>100</sup> argue that to question a map's being (its ontology) does not adequately account for a map's becoming (its ontogenesis). Maps aren't ever themselves: they are always processual, problem-solving spatial practices that are re-made every time the map is gazed upon, worked with, and worked on. Maps do not move through the world as fixed objects, but instead unfold over the course of multiple and unpredictable encounters, producing truth effects that are relational and negotiated within their immediate contexts.<sup>101</sup> Such a position implies that research into mapping deploys different methods. In particular, to conceive of a map as always unfolding requires ethnographic approaches sensitive to the materiality of mapping practice and those moments in which maps make a difference in decision-making.<sup>102</sup> I place these post-representational approaches within the tradition of cartographic-cartesian anxiety, insofar as their object is to destabilize the object of knowledge. To be post-representational, cartographically, is to be anxious about the map, aware of its inability to carry and convey its meaning in a manner that is not tripped up by the irruption of troubling others.

For cartography, following the post-representational intervention, to draw is to be responsible for the difference it makes. To depict is to be anxiously aware that depictions have

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<sup>100</sup>Rob Kitchin and Martin Dodge, "Rethinking Maps," *Progress in Human Geography* 31, no. 3 (2007): 331–44, doi:10.1177/0309132507077082; Martin Dodge, Rob Kitchin, and Chris Perkins, eds., *Rethinking Maps: New Frontiers in Cartographic Theory* (London, UK: Routledge, 2009).

<sup>101</sup>Kitchin, Gleeson, and Dodge, "Unfolding Mapping Practices: A New Epistemology for Cartography."

<sup>102</sup>Martin Dodge, Chris Perkins, and Rob Kitchin, "Mapping Modes, Methods, and Moments: A Manifesto for Map Studies," in *Rethinking Maps: New Frontiers in Cartographic Theory*, ed. Martin Dodge, Rob Kitchin, and Chris Perkins (London, UK: Routledge, 2009), 220–43.

a bad habit of refusing to rest on their laurels, making the world in their own image even as they profess the faith of the neutral party.

These source texts hold focus on the relationship between representation and the represented; signifiers and the signified; subject and object; pick the pairing best matched to your theoretical predispositions. In other words, what was being called into question was the possibility of detached characterization of the objects of knowledge. This is the so-called ‘crisis of representation’ that hangs its weary head over knowledge production in the humanistic wings of the social sciences. The various articulations of the anxieties that follow from the crisis of representation centered on matters of correspondence between word and world.

And yet, in the clinical literature ‘anxiety’ is not merely a fearful affect. While it is in dispute as to whether anxiety can be distinguished from fear, those who maintain the legitimacy of the distinction make it in terms of the purported relationship to *the future*. Barlow, for example, describes anxiety as “a unique and coherent cognitive-affective structure within our defensive and motivational system[.] At the heart of this structure is a sense of uncontrollability focused largely on possible future threats, danger, or other upcoming potentially negative events.”<sup>103</sup> Anxiety has much to do with futurity. To describe ourselves as anxious is also to describe ourselves as being in a state of anticipation. As Brian Massumi reminds us, fear of the future makes that future present as a certain kind of fact.<sup>104</sup> As Ben Anderson reminds us, anticipation must be practiced.<sup>105</sup> To be anxious is to be dealing, factually, with the threatening potentiality of many possible futures. I use anxiety in this far more doxic

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<sup>103</sup>David H. Barlow, “Unraveling the Mysteries of Anxiety and Its Disorders from the Perspective of Emotion Theory.” *American Psychologist* 55, no. 11 (2000): 1249, doi:10.1037/0003-066X.55.11.1247.

<sup>104</sup>Massumi, “The Future Birth of the Affective Fact: The Political Ontology of Threat.”

<sup>105</sup>Ben Anderson, “Preemption, Precaution, Preparedness: Anticipatory Action and Future Geographies,” *Progress in Human Geography* 34, no. 6 (2010): 777–98, doi:10.1177/0309132510362600.

way than the Lacanian anxiety that has recently appeared in geographic scholarship. For Lacan, anxiety is an affect brought about by encounter with the other, whose alterity alerts the subject their own incoherence; Gökarıksel and Secor invoke this anxiety to theorize the embodied geopolitics of Syrian migration to Turkey.<sup>106</sup> Robbins and Moore deploy Lacan's to anxiety to understand the politically enervating displacement of the absence that sits at the heart of scientific enterprise into phobic responses to the self and the human enterprise.<sup>107</sup>

Thinking of terms of anxiety, then, turns us toward the futurity of knowledge, even as it is diagnostic, not normative. There is no implicit critique in identifying a figure or subject position as anxious. Furthermore, at least according to Miceli, anxiety links knowledge with action! "The rigid subordination of pragmatic control to a very demanding epistemic control: 'if I cannot foresee I cannot act.' ... this attitude hampers actual planning."<sup>108</sup> I therefore use anxiety to characterize, to identify qualities and (to push the figure past its breaking point) to pursue the patient's wellbeing. To attend to the anxious subject is to care, not to condemn, to embrace, not to dismiss. I do not suggest that anxiety is 'behind' or 'beneath' the pedagogies or projects discussed here; you will find no such suspicious figurations in these pages, no paranoia in my reading.<sup>109</sup> To 'diagnose' as I do here is to suggest a certain sympathy—at the very least, to suggest a desire that events and objects under consideration keep living.

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<sup>106</sup>Banu Gökarıksel and Anna J. Secor, "Affective Geopolitics: Anxiety, Pain, and Ethics in the Encounter with Syrian Refugees in Turkey," *Environment and Planning C: Politics and Space*, 2018, doi:10.1177/2399654418814257.

<sup>107</sup>Paul Robbins and Sarah A. Moore, "Ecological Anxiety Disorder: Diagnosing the Politics of the Anthropocene," *Cultural Geographies* 20, no. 1 (2013): 3–19, doi:10.1177/1474474012469887.

<sup>108</sup>Maria Miceli and Cristiano Castelfranchi, "Anxiety as an 'Epistemic' Emotion: An Uncertainty Theory of Anxiety," *Anxiety, Stress & Coping* 18, no. 4 (2005): 313, doi:10.1080/10615800500209324.

<sup>109</sup>Felski, *The Limits of Critique*; Eve Kosofsky Sedgwick, "Paranoid Reading and Reparative Reading, or, You're so Paranoid, You Probably Think This Introduction Is About You," in *Touching Feeling: Affect, Pedagogy, Performativity* (Durham, NC: Duke University Press, 1997), 123–51.

## 2.5 'OUGHT ANXIETY'

In all of this, the rub is that geographers seem to have tacitly embraced a narrative in which map-makers either a) recognize the power of maps to *inscribe*, to *affect*, to *perform* (I am here somewhat ambivalent as to whether we embrace the language of Pickles, Deleuze and Guattari, or Butler); or b) play power games with their maps, enabled by the ideological veil that hides their intention from their public. The first is associated with contemporary 'post-representational' approaches to mapping; the latter is associated with the critical cartography tradition after Brian Harley.<sup>110</sup>

I argue that this range of options corresponds quite poorly to much of the cartographic practice that influenced the makers of early geospatial technology: namely, practitioners and pedagogues in the design disciplines. Much of the history of GIS has tacitly acknowledged the significance of these disciplines in shaping geospatial technologies, but has not dealt fully with the theoretical implications of writing the history of GIS from the perspective of designers, planners, landscape architects, and others who muster cartographic artifacts in support of effecting material change on the surface of the earth. In this way, critics of geospatial technologies in geography have been blinkered by their own disciplinary location, neglecting to notice that while the epistemological orientations of the GIS industry have certainly been influenced by empiricism, pragmatism and normative interventionism have also been very much in play.<sup>111</sup> By tending to locate the predecessors of GIS in and alongside

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<sup>110</sup>Rob Kitchin, Chris Perkins, and Martin Dodge, "Thinking About Maps," in *Rethinking Maps: New Frontiers in Cartographic Theory*, ed. Martin Dodge, Rob Kitchin, and Chris Perkins (London, UK: Routledge, 2009).

<sup>111</sup>In naming 'empiricism', I intentionally refuse the label 'positivism' for at least those reasons given by Eric Sheppard, "We Have Never Been Positivist," *Urban Geography* 35, no. 5 (2014): 636–44, doi:10.1080/02723638.2014.916907.

the our own quantitative revolutions, geographers fail to note that many routes through the history of GIS lead through the design and planning disciplines; for the practitioners of these, the ‘map’ makes no claim to absolute empirical validity. Instead, it seeks—and fails—to legitimate and materialize a proposed intervention.

Above, I traced a similar myopia in those that have theorized the knowledge-political earthquakes of the last decades; Cartesian and cartographic anxieties are often directed at the ends of knowledge and not simply the prospect of knowing. Cartographic anxiety is not merely descriptive for planners and design practitioners. Cartographic anxiety carries an additional fragility: that even if the map is representationally coherent, it may not be persuasive, which is to say affective. It may not make the world move. Plans and proposals, as maps that concern themselves with a specific normative futurity, are prone to falling flat, going nowhere, doing little. I call the nagging recognition of this potential for failure, ‘ought anxiety’, and it is a diagnosis imprecisely located in the the literature of geography.

One of the few geographers to note this explicitly was Cosgrove, who notes briefly in the introduction to the edited volume *Mappings* that...

the most challenging mappings today are found in the creative and imaginative work of artists, architects, and designers, neither seeking absolute empirical warranty for their maps nor claiming for them any metaphysical revelation. Mapping in a flexible era has become a creative and critical intervention within broader discourses of space and the ways that it may be inhabited. Mapping is freed from the problems of factual legitimacy and authority with which a centric and rationalist model of absolute space has until recently burdened it.<sup>112</sup>

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<sup>112</sup>Denis Cosgrove, “Introduction: Mapping Meaning,” in *Mappings*, ed. Denis Cosgrove (London, UK:

While here there is a degree of optimism about the play found in the designerly map, Cosgrove analyzes the ‘work of artists, architects, and designers’ quite differently elsewhere: less as a playful and critical intervention and more as a governing tactic and planning tool. Cosgrove speaks of the map as having often “preceded the physical presense of the city or served to regulate and coordinate its continued existence. ... Virtually every great city ... has been either reconstructed or expanded by means of a drawn plan. ... The urban map is positioned between creating and recording the city.”<sup>113</sup> This divergence in Cosgrove’s thought—between flexible, cartographic play and governing logic—illustrates a difficulty common in the critical cartographic literature; the map is, by turns, contingent and determinative, always-already emerging in worldly encounters, and bringing the world into being through forceful representation.

A recent debate between Wilson and Aalbers in *Area* illustrates my point about the slippage between post-representationalism, on the one hand, and implied cartographic determinism on the other. Over the course of a two-part series, Aalbers presents an analysis of the role of maps in producing, for example, benign neglect in the New York of the 1970s and planned shrinkage in contemporary Cleveland. He argues that, though maps produced by governing bodies did not deterministically produce space, they contributed to bringing into being the very conditions they described. Aalbers follows MacKenzie’s well-known argument that economics, as a disciplinary knowledge, makes the economy in the image of that purportedly descriptive science.<sup>114</sup> The rub, then, for Aalbers is the familiar critical call-out

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Reaktion Books, 1999), 19.

<sup>113</sup>Denis Cosgrove, “Carto-City,” in *Geography & Vision: Seeing, Imagining, and Representing the World* (London, UK: Tauris, 2008), 169–71.

<sup>114</sup>Donald Mackenzie, *An Engine, Not a Camera: How Financial Models Shape Markets* (Cambridge, MA: The MIT Press, 2008).

of a sleight of hand: that even declarative utterances change the situation.<sup>115</sup> Or: “Maps may have *descriptive* as well as *prescriptive* and *performative* qualities”.

Fair enough. But Wilson’s exasperated response tells us something about a useful means of triangulation between what can sometimes seem a dizzying oscillation between contingency (‘maps emerge in relation to the actants they encounter’) and determinism (‘maps make geography’) in the critical cartographic literature.<sup>116</sup> Yes! Fine! Okay! Maps have (and have had) more-than-representational effects. At this point, we’ve constructed a robust catalogue of instances in which the drawn line inscribed itself upon our social worlds. However, Wilson argues that pointing, over and over, at the productivity of the cartographic object (and project) is beginning to yield both diminishing intellectual returns and a stultifying gestural tedium. Our fingers, so used to pointing out that representations are active, become arthritic. Even as we *do* in modes historical, theoretical, technical, or political—more likely all at once—we must responsibly and responsively pursue differences made by the drawing of a line.

This point is borne out by designers explicating what cartography does for design. Desimini and Waldheim offer a useful schema in which a map is distinguished from a plan. A plan is “a directive document that serves as a guide for some action in the future,” or “a generator to envision and make space, a tool to project, design, speculate, and propose what is possible.”<sup>117</sup> Similarly, Corner, in a well-known 1999 essay, argues that maps are grounds

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<sup>115</sup>Manuel Aalbers, “Do Maps Make Geography? Part 1: Redlining, Planned Shrinkage, and the Places of Decline,” *ACME* 13, no. 4 (2014): 525–66, <https://acme-journal.org/index.php/acme/article/view/1036>; Manuel Aalbers, “Do Maps Make Geography? Part 2: Post-Katrina New Orleans, Post-Foreclosure Cleveland and Neoliberal Urbanism,” *ACME* 13, no. 4 (2014): 557–82, <https://acme-journal.org/index.php/acme/article/view/1038>.

<sup>116</sup>“Map the Trace,” *ACME* 13, no. 4 (2014): 583–85, <https://acme-journal.org/index.php/acme/article/view/1039>.

<sup>117</sup>Desimini and Waldheim, *Cartographic Grounds: Projecting the Landscape Imaginary*, 13.

for experimentation, and operative fields that generate spatial strategies.<sup>118</sup>

At which some might be inclined to stop me; what you're describing are not maps, they are plans. Maps describe, plans prescribe. Full stop. I understand the objection. I find, though, something useful in maintaining the flattened ontology of cartographics. Desimini and Waldheim do *not* juxtapose the plan to the map, even going so far as to argue that their aim to consider their parallels. Rather, the map is held in opposition to the *data visualization*, which as strict representations eliminate the speculative agency of design.

A serious consideration of the relationship of maps to prescriptive action is a techno-historical lacuna. We've let geographers write the history of GIS; in so doing, we've backed ourselves into endless rehearsals of the crisis of representation (or the self-immolating recursion of non- or post-representation) where a pragmatic history, concerned with the affects and effects of maps as plans, as proposals, as interventions, has been right in front of us. Social histories of GIS have tended to prefer simple critiques of representation to the difficult pragmatics of drawings projective orientations toward the world. That maps *do* is well-worn. That some maps *do not*? Less so. That these doings involve a great deal of translational work? Even less so.

In what follows, I explore at length the means through which evidence was accumulated in McHarg's practice; evidence in rhetorical support of an argument for material change on the surface of the earth. More than this, though, I examine the epistemic aesthetic figure of the 'layer': as a form of evidence that involves the synthetic application of multiple forms of knowledge about a site for intervention at any scale. I begin by placing his work in the context of geographic thought... namely, the historical geography of Carl Sauer, and

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<sup>118</sup>Corner, "The Agency of Mapping: Speculation, Critique, and Invention."



the proto-environmentalist analyses of George Perkins Marsh. Through attention to this milieu, I draw a line; a line that traces through the promising early bursts of trans-disciplinary energy around environmental issues at midcentury; a line that sees that promise bureaucratized and philanthropized; a line that examines ‘layering’ as a model not only in GIS, but also in a particular form of environmentalism writ large. Expertise-oriented and scientific, yes, but also ambitious in its articulation and practice of ecological care.

## 2.6 A CLASSIC UTILIZATION OF GEOGRAPHIC METHODOLOGY

McHarg had been selected by Maynard Weston Dow as a ‘distinguished geographer’, and was interviewed on the occasion of the 1979 annual conference of the American Association of Geographers in Philadelphia. Wilbur Zelinsky described this iteration of the AAG’s annual meeting as “bathed in a mellow haze of euphoria”, even if some of this haze might have been due to hyperventilation—after all, the meeting was characterized by “the exuberant brachiation and the diversification of geography plus general trendiness so much in evidence at other recent annual meetings.”<sup>119</sup>

Given the prevalence ascribed by historians of geography to the closure at Harvard (see my third chapter), it is not surprising that much of the Dow’s interview with McHarg focuses on the latter’s time in Cambridge. He completed his Master of City Planning and Master of Landscape Architecture degrees between 1946 and 1950—precisely that period burned into the minds of academic geographers with a still-smarting Crimson wound. McHarg notes that he took classes with Derwent Whittlesey, Edward Ullman, and Edward Ackerman, all

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<sup>119</sup>Wilbur Zelinsky, “The Diamond-Anniversary Meeting of the AAG,” *Geographical Review* 69, no. 4 (1979): 468–70, doi:10.2307/214810, 469; The video recording of the interview between ‘Wes’ Dow and McHarg dates their interview to October 1978. But given that Dow filmed geographers almost entirely at annual meetings of the AAG, and that the AAG was held in Philadelphia from April 22-25, 1979 it seems likely that the film is incorrectly dated.

of whom he disparages for their adherence to economic paradigms. McHarg was nothing if not a dedicated ecological anti-economist, a position that would not incline him to appreciate the work of Ullman, a geographer distrustful of the synthesizing claims of geography in and around mid-century. Ullman, for example, had made the argument that ‘man and environment relations’ were not legitimate objects of geographical study in front of a Harvard faculty committee tasked with deciding the fate of the discipline at that institution.<sup>120</sup> Dow asks after Whittlesey and we need not strain to hear in McHarg’s response—“a very distinguished, handsome attractive man. Spoke very, very well”—a tinge of veiled homophobia, elicited by memories of Whittlesey’s relationship with Harold Kemp.<sup>121</sup> This would be consistent with a stream of homophobia found throughout McHarg’s written record, as well as in the recollections of his family members.<sup>122</sup>

My interest here, though, is in McHarg’s assessment of geography and planning as knowledge producing disciplines, and specifically in his characterization of their forms of synthe-

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<sup>120</sup>Thomas F. Glick, “Before the Revolution: Edward Ullman and the Crisis of Geography at Harvard,” in *Geography in New England*, ed. John E. Harmon and Timothy J. Rickard (New Britain, CT: New England Geographical Society, 1989), 49–62.

<sup>121</sup>Smith, “Academic War over the Field of Geography’: The Elimination of Geography at Harvard, 1947–1951.”

<sup>122</sup>McHarg’s son Alistair maintains a blog, in which he wrote about his recollection of Earth Day in Philadelphia, April 22, 1970, on the occasion of which the leftist, gay poet Allen Ginsberg kissed his father on the lips before the thronging crowds. “There, before God and thousands of witnesses, my father lived his worst nightmare. On the one hand, he was receiving adulation from a bona fide legend, and my dad was impressed by celebrity in a way that is, perhaps, unique to celebrities; people who dearly believe in the idea that being famous has intrinsic value. So, feigning happiness was mandatory. On the other hand, he was a fearsome individual with a passion for intimidation—war hero, bully, tough guy—homophobia was woven into his tweed. Indeed, he once admitted that, if he had to choose, he would prefer a mentally retarded child to a gay one. ... At his funeral I made the observation, ‘Wherever he is, he’s probably still trying to wipe that kiss off.’” Alistair McHarg, “Earth Day,” April 23, 2013, <http://blog.alistairmcharg.com/2013/04/earth-day/>

A more asinine example of this appears in his archive when he writes to the company that had filmed an address given in San Diego in 1985, “...I would hate to be sued so will you remove my reference to sexual preferences of post-modern architects? I think the talk can survive this editing.” Ian L. McHarg to Steven L. Reiss, July 3, 1985, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA. And in a profile in *Science*, he describes the reception of his approach within the discipline thusly: “I had to grab colleagues by the scruff of the neck and hold them long enough to at least reveal my obsession ... at that time they thought you were either a pansy or a nut.” Constance Holden, “Ian McHarg: Champion for Design with Nature,” *Science* 195, no. 4276 (1977): 381, doi:10.1126/science.195.4276.379

sis. He is not a supporter of the computationally-enabled forms of geography then flourishing in the the geography departments at Washington, Iowa, Ohio State, and Michigan, nor is he particularly fond of regional science. In fact, he outright mocks Isard's Department of Regional Science at the University of Pennsylvania, then an active force—albeit one that was already under-delivering on its promises and under threat from declining University enrollments.<sup>123</sup> He describes it as “a lovely exercise, rather like chess”: an abstractive, if parsimonious, tool that is entirely unusable by planners. In at least this moment, McHarg resembles no one more than Peter Taylor who compared GIS to “high-tech trivial pursuit” in want of a disciplinary ground.<sup>124</sup>

If regional science, was bunk, to what form of geographic inquiry should planners aspire? The geographer to which he points as an ‘apex’ is not party to the so-called ‘quantitative revolution’. Despite the later evaluation of McHarg’s career as being progenitive of computational approaches, it is neither Warntz nor Garrison, Bunge nor Isard for whom McHarg reserves his admiration; it is the regionalist and self-professed ‘cranky old backwoodsman’ Carl Sauer. McHarg was astonished that in Sauer, he had found a figure and a discipline that knew “the physical world, the biological world, and the social world” and that was capable of unifying them. Sauer’s relegation to the stodgy margins of the discipline was also understood to be representative of geography’s decline: “I think this whole dimension in cultural

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<sup>123</sup> Antoine S. Bailly, William J. Coffey, and Lay J. Gibson, “Regional Science: Back to the Future?” *The Annals of Regional Science* 30, no. 2 (1996): 153–63, doi:10.1007/BF01581970; Trevor J. Barnes, “What’s Wrong with American Regional Science? A View from Science Studies,” *Canadian Journal of Regional Science* 26, no. 1 (2003): 1–22, <http://www.cjrs-rcsr.org/archives/26-1/barnes.pdf>; Trevor J. Barnes, “The Rise (and Decline) of American Regional Science: Lessons for the New Economic Geography?” *Journal of Economic Geography* 4, no. 2 (2004): 107–29, doi:10.1093/jeg/4.2.107; Amy Glasmeier, “Geographic Intersections of Regional Science: Reflections on Walter Isard’s Contributions to Geography,” *Journal of Geographical Systems* 6, no. 1 (2004): 27–41, doi:10.1007/s10109-003-0121-0.

<sup>124</sup> Peter J. Taylor, “Editorial Comment: GKS,” *Political Geography Quarterly* 9, no. 3 (1990): 212, doi:10.1016/0260-9827(90)90023-4.

geography was an apex and I regret that it's not anywhere as pervasive as it once was."<sup>125</sup>

McHarg tells Dow that he was first impressed by Sauer upon encountering his contributions to *Man's Role in the Changing Face of the Earth*, a voluminous text that represented the proceedings of a 1955 symposium chaired by Sauer, the urban historian (and student of Patrick Geddes) Lewis Mumford, and the University of Michigan zoologist Marston Bates.<sup>126</sup> The Wrenner-Gren Foundation for Anthropological Research hosted this conference on the suggestion of William Thomas, geographer and assistant director of the foundation, who proposed a conference on anthropology and geography that would focus on 'man's impact as a dynamic agent in changing the face of the earth'. It is in keeping with the naturalistic nostalgia for Mumford's paleolithic environment that the conference was moved from New York to Princeton, New Jersey, in order to escape the stultifying 'air conditioned catacombs' of New York.<sup>127</sup>

I hold focus on *Man's Role* for a duration that might seem to exceed its due. I do so deliberately. The symposium is analytically interesting for geography's disciplinary history for two reasons. The first is that it deviated enormously from what dominated the field at the moment of its publication in 1955. Geographers had spent much of the latter half of the 19<sup>th</sup> century reducing the 'environment' to its causal role as a determinant of human settlement patterns and moral qualities;<sup>128</sup> it spent the first half of the 20<sup>th</sup> developing a cri-

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<sup>125</sup>Ian L. McHarg, Geographers on Film Interview With Ian McHarg., interview by Maynard Weston Dow, Video, October 1978, Library of Congress, <https://www.loc.gov/item/mbrs01845311/>, n.p.

<sup>126</sup>William L. Thomas Jr. et al., eds., *Man's Role in Changing the Face of the Earth* (Chicago, IL: University of Chicago Press, 1956).

<sup>127</sup>For a archivally rich account of Carl Sauer's influence on the development and intellectual content of this conference, see Michael Williams, "Sauer and 'Man's Role in Changing the Face of the Earth,'" *Geographical Review* 77, no. 2 (1987): 218, doi:10.2307/214982.

<sup>128</sup>Ellen Churchill Semple, *Influences of Geographic Environment, on the Basis of Ratzel's System of Anthropo-Geography* (New York, NY: Henry Holt and Company, 1911).

tique of the same.<sup>129</sup> According to some commentators, this left the discipline ill-equipped to address the environmental crisis of the 1960 in which it was very much the earth despoiled, not despoiling.<sup>130</sup> According to geography's standard line of self-articulation—that it a unifying approach that bridges the social and physical sciences<sup>131</sup>—such a problem domain should have been precisely within the remit of professional geographers. However, despite the persistence of cultural ecology at institutions like Berkeley (and the emergence of young scholars that would articulate the subfield we now call political ecology, e.g., Bernard Nietschmann and Michael Watts), human geographers had discarded physical-geographic knowledge, even if they had not necessarily taken the step of purging it from their departments. This symposium suggested a reading of human-environment relations that was neither deterministic nor ahistorical. For precisely these reasons, it cut against the grain of geographic scholarship at the time at which it arrived. This might explain the relative paucity of geographers within the assembled roster of scholars.

Indeed, by this time, Sauer's synthetic approach—to which McHarg aspired—was not in favor within geography. In the 'Geographers on Film' interview, McHarg praises this abdicated pedagogical potential of geography to cultivate in the student a 'synoptic view'. Such a potentially 'synthesizing discipline' was antithetical to what McHarg understood to be planning's obliviousness to the human world's biophysical substrates—a shame, since planning was "not terribly competent to deal with the social world either." Despite his apparently blase assessment of Harvard geography at the time of Whittlesey and its discontinuance, he

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<sup>129</sup>David N. Livingstone, *The Geographical Tradition: Episodes in the History of a Contested Enterprise* (Oxford, UK: Blackwell, 1993).

<sup>130</sup>F. Kenneth Hare, "Environment: Resuscitation of an Idea," *Area* 1, no. 4 (1969): 52–55, <https://www-jstor-org.libproxy.mit.edu/stable/20000386>; Geoffrey J. Martin, *American Geography and Geographers: Toward Geographical Science* (New York, NY: Oxford University Press, 2015).

<sup>131</sup>Glick, "In Search of Geography."

suggests to Dow that he “would love to see geography take a much, much larger role in general education. Geography departments being much more powerful,” not least because the synthetic inclination of the geographer makes them exceptional recruits to planning departments. In a moment of unusual humility, when Dow suggests that *Design with Nature* is “a classic utilization of geographic methodology”, McHarg responds: “that’s right and if only someone had taught me that kind of geography, see, I would have known. ... It’s just unbelievable that in this day and age someone could rediscover old knowledge and re-present it. I suppose that’s just what I did.”<sup>132</sup>

While the appearance of terms like ‘ecological determinism’ in McHarg’s writing might be enough to send shivers up the spine of geographers after the 20th century, what McHarg meant was not that the landscape *does* determine the contours of human settlement patterns. He meant only that we might live better if it did.<sup>133</sup> If his analysis of urban morphology frames the built environment as a surface expression of deterministic processes, it does so to explicitly condemn built form and concomitant social relations under extractive capital. His polemic hinges on his argument that with the rise of industrial capitalism, the natural processes that had their expression in urban form were eradicated from practices of city-building. His point was precisely that 20<sup>th</sup>-century urbanization was not determined by the environment of the earth, and this was to the detriment of an anthropocentric society. To live according to its laws was a normative charge, not a nomothetic principle. His point is conservative, but it is not the argument of a social physicist.

For at least these reasons, we might better understand McHarg as within the lineage of

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<sup>132</sup>McHarg, Geographers on Film Interview With Ian McHarg.

<sup>133</sup>See, for example, Ian L. McHarg, “Ecological Determinism,” in *Future Environments of North America*, ed. F. Fraser Darling and John P. Milton (Garden City, NY: The Natural History Press, 1966), 526–38.

George Perkins Marsh, a figure that animated the *Man's Role* conference to the point that Sauer described the entire proceedings as “a sort of Marsh festival” and the published text was dedicated to him.<sup>134</sup> In his classic *Man and Nature; or, Physical Geography as Modified by Human Action* of 1868, Marsh paints an unusual image of human agency, particularly given the explanatory thrust of the social sciences in the mid-19th century. Marsh sought not to explain human behavior with reference to the environment, but to catalog the human effect on the environment. Against then-dominant resource triumphalism, Marsh suggests that what appeared to be the enjoyment of bounty was in fact the exploitative on-ramp to existential despoilation, with obvious implications for *planning*.<sup>135</sup> Indeed, it was none other than the civil surveyor and planner Patrick Geddes who had called Lewis Mumford's attention to Marsh's work, well before the Princeton conference that would re-elevate Marsh, itself occurring well before a Harvard University Press reissue of *Man and Nature* made the text newly available.<sup>136</sup>

In contrast with the theoreticism of Guyot and Ritter, and those that followed them in the American tradition, Marsh argues that in addition to studying “how far external physical conditions ... have influenced the social life and social progress of man,” geography should dedicate itself to studying how “man has reacted upon organic and inorganic nature, and

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<sup>134</sup>Daniel W. Gade, “The Growing Recognition of George Perkins Marsh,” *Geographical Review* 73, no. 3 (1983): 341, doi:10.2307/214840.

<sup>135</sup>George Perkins Marsh, *Man and Nature; or, Physical Geography as Modified by Human Action*, ed. David Lowenthal (Seattle, WA: University of Washington Press, 2003).

<sup>136</sup>David Lowenthal, “Introduction to the 2003 Edition,” in *Man and Nature; or, Physical Geography as Modified by Human Action* (Seattle: University of Washington Press, 2003); David Lowenthal, *George Perkins Marsh: Prophet of Conservation* (Seattle, WA: University of Washington Press, 2003); Mumford has been largely forgotten as an environmental thinker, this despite the strenuous argumentation of Guha in the early 1990s Ramachandra Guha, “Lewis Mumford: The Forgotten American Environmentalist: An Essay in Rehabilitation,” *Capitalism Nature Socialism* 2, no. 3 (1991): 67–91, doi:10.1080/10455759109358458; but his place here reacquaints the contemporary reader with the position accorded Mumford in the post-war period.

thereby modified, if not determined the material structure of his earthly home.”<sup>137</sup> It is not for nothing that Marsh’s sole methodological treatise was an unpublished introduction to the French geographer, empiricist, and anarchist Reclus’s *La Terre; description des phenomenes de la vie du globe* (*The Earth: A Description of the Phenomena of the Life of the Globe*) rather than e.g., Ritter’s *Die Erdkunde im Verhältniss zur Natur und zur Geschichte des Menschen* (*Geography in Relation to Nature and the History of Mankind*).

The second reason we might hold focus is not genealogical, but pragmatic; *Man’s Role in Changing the Face of the Earth* was emblematic of the epistemic aesthetic regime that would shape much of McHarg’s early development, particularly his vision of interdisciplinary holism and cartographic integration. This is the post-war rise of expertise-oriented conservation institutions endowed by dynastic liberal philanthropies in the United States—e.g., The Conservation Foundation and the Natural Resources Defense Council, both of which benefited from the early support of the Rockefeller, Ford, and Mellon foundations. Over the course of the 1960s, McHarg would become a beneficiary of the foundation munificence; both directly, as a recipient of grants from both Ford and Rockefeller, and indirectly through the consistent support of the Conservation Foundation.

## 2.7 ENVIRONMENTAL FUTURES

Though McHarg was not present for the *Man’s Role* conference in 1955, he was a participant in its spiritual successor: *Future Environments of North America*, held in April 1965 in Warrenton, Virginia. A similar cast of characters, in similar surrounds (though a noticeable paucity of geographers). Reviewing the published volume that followed the proceedings for

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<sup>137</sup>Marsh, *Man and Nature; or, Physical Geography as Modified by Human Action*.



*Economic Geography*, Burton notes that the similarities extend even to the selection of Mumford as the voice to provide closure... and the inclusion of self-aware verse by the economist and systems theorist Kenneth Boulding.<sup>138</sup>

There were, however, differences. Where *Man's Role* had benefited from the support of the Wrenner-Gren Foundation for Anthropological Research and the National Science Foundation (NSF)—two predominantly academic institutions—the Conservation Foundation convened *Future Environments*. In convening the conference, the foundation received the financial support of Sarah Mellon Scaife. Scaife was heir to the Mellon family fortune which included controlling stakes in Gulf Oil and the Pittsburgh Consolidated Coal Company.<sup>139</sup> In 1942, she received the largest income tax return of any individual in the United States—\$681,356.64.<sup>140</sup> If we indulge the finger its impulse to trace the family tree down an additional generation, we find that Scaife's son, Richard Mellon Scaife, was at one point the most significant donor to conservative causes in United States history. Her daughter, Cordelia Scaife May, was a founding donor of multiple nativist and immigration restriction groups—the Federation for American Immigration Reform, NumbersUSA and the Center

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<sup>138</sup>Ian Burton, "Future Environments of North America (Being the Record of a Conference Convened by the Conservation Foundation in April, 1965, at Airlie House, Warrenton, Virginia) Edited by F. FRASER DARLING and JOHN P. MILTON. Xv and 767 Pp.; Diagr., Chapter Bibliogr., Index. Natural History Press, Garden City, N.y., 1966. \$12.50. 912 X 64 Inches." *Economic Geography* 44, no. 2 (1968): 184, doi:10.2307/143319. Boulding's poetry was a recurring feature in such proceedings. 'The mountains, rivers, lakes, and grass/Are fine for men of middle class/But nature has much less allure/For women and the urban poor' Kenneth E. Boulding, "Puzzle," in *Future Environments of North America*, ed. F. Fraser Darling and John P. Milton (Garden City, NY: The Natural History Press, 1966), 717–18, 717. In 1965, 'Land is sinking, seas are rising/Man is far too enterprising/Fire will rage with Man to fan it/Soon we'll have a plundered planet. People breed like fertile rabbits/People have disgusting habits.' Kenneth E. Boulding, "A Conservationist's Lament, the Technologist's Reply," in *Man's Role in Changing the Face of the Earth*, ed. Carl O. Sauer, Marston Bates, and Lewis Mumford (Garden City, NY: The Natural History Press, 1966), 1087, 1087

<sup>139</sup>"Alan M. Scaife, an Industrialist," *The New York Times*, July 25, 1958, <https://timesmachine.nytimes.com/timesmachine/1958/07/25/82212129.pdf>.

<sup>140</sup>\$10,751,556 in 2019 dollars, see "Mrs. Alan Scaife, Art Patron, Dies," *The New York Times*, December 29, 1965, <https://timesmachine.nytimes.com/timesmachine/1965/12/29/95921824.pdf>.

for Immigration Studies—and a venomous neo-Malthusian.<sup>141</sup>

There was also a changed orientation to questions of human futurity. While *Man's Role* eventually entertained questions of the future, the inclusion of prospective thought was horrifying for Carl Sauer. Ever a historical geographer, Sauer was petrified by the normative stance implied by the postulation of a future condition. Williams notes that this hesitancy to engage with matters of futurity was mirrored in the volume's uptake among disciplined geographers. "Almost all reviews, especially those by geographers and archaeologists, tended to concentrate on the Retrospect and Process parts of because they were recognizably in the mold of much geographical writing."<sup>142</sup> Williams also claims that geographers showed less interest in the "provocative, exciting, and ultimately prophetic 'Prospect' that was somehow not geography as it was then conceived"<sup>143</sup>—though this generalization seems hard to justify given that both Preston James for *Economic Geography* and Philip Wagner for the *Annals*<sup>144</sup> engage with the prospective chapters of *Man's Role*.

*Future Environments* was not so circumspect about matters of the future. The ecologist F. Fraser Darling, then the Vice President of the Conservation Foundation and Conference Chair, compares the two events in this way: "[in 1955], the assembled company... was concerned with the whole planet and the past. We are going to think about the North American continent and the future."<sup>145</sup> If it was widely recognized, ten years after the 'Marsh festival',

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<sup>141</sup>Nicholas Kulish and Mike McIntire, "Why an Heiress Spent Her Fortune Trying to Keep Immigrants Out," *The New York Times*, August 14, 2019, <https://www.nytimes.com/2019/08/14/us/anti-immigration-cordelia-scaife-may.html>.

<sup>142</sup>Williams, "Sauer and 'Man's Role in Changing the Face of the Earth'" 230.

<sup>143</sup>*Ibid.*, 230.

<sup>144</sup>Preston E. James, "Man's Role in Changing the Face of the Earth: A Review," *Economic Geography* 33, no. 3 (1957): 267, doi:10.2307/142313; Philip L. Wagner, "The Face of the Earth," *Annals of the Association of American Geographers* 47, no. 2 (1957): 191–93, doi:j.1467-8306.1957.tb01533.x.

<sup>145</sup>F. Fraser Darling, "Introduction," in *Future Environments of North America*, ed. F. Fraser Darling and John P. Milton (Garden City, NY: The Natural History Press, 1966), 2; Burton, "Future Environments of North America (Being the Record of a Conference Convened by the Conservation Foundation in April, 1965, at Airlie

that human planetary agency was non-negligable, it was also fodder for ecological paternalism that was nothing if not in keeping with expectations of a gathering convened by one of the many philanthropic faces of dynastic wealth. Darling begins the conference by noting that “we want our dominance to be an expression of the aristocratic ideal, that of being the servant of those less able to care for themselves.”<sup>146</sup>

These paternalistic patricians were also, maybe surprisingly, a bit more circumspect than their forebears according to the geographer, Burton.

The pessimistic conservationists and neo-Malthusians [in attendance at the *Man's Role* conference] made dire predictions, but at least they knew (or thought they knew) the answers. Today it is increasingly recognized that we are not able to specify with precision what the consequences of our application of new technology to the environment will be, and that great uncertainty attaches to almost all available choices.<sup>147</sup>

This did not seem to apply to McHarg who here formally codified his theory of ‘ecological determinism’. However, I argue that, though the word sends shivers up the spine of geographers, the ‘determinism’ identified here is of a strange sort indeed. One that is so far from following from natural law that it must be requested... and not of God or other transcendent watchmakers, but of mere professionals doing their work.

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House, Warrenton, Virginia) Edited by F. FRASER DARLING and JOHN P. MILTON. Xv and 767 Pp.; Diags., Chapter Bibliogrs., Index. Natural History Press, Garden City, N.y., 1966. \$12.50. 912 X 64 Inches.” can’t help but noticing that the conference nevertheless included the conspicuous presence of the United Kingdom, apparently an honorary transatlantic limb.

<sup>146</sup>Darling, “Introduction,” 3.

<sup>147</sup>Burton, “Future Environments of North America (Being the Record of a Conference Convened by the Conservation Foundation in April, 1965, at Airlie House, Warrenton, Virginia) Edited by F. FRASER DARLING and JOHN P. MILTON. Xv and 767 Pp.; Diags., Chapter Bibliogrs., Index. Natural History Press, Garden City, N.y., 1966. \$12.50. 912 X 64 Inches.” 185.

As the representative of a profession with a historic concern for the relation of man to nature and the single bridge between the natural sciences and the artificers of the urban environment [pace geographers], it is not inappropriate that the spokesman for this group ask for the formulation of an ecological determinism.<sup>148</sup>

This is a normative, prospective determinism, not a descriptive determinism which, despite the fearful reputation of the normative, goes some ways towards disempowering the determinants. While McHarg argues that natural processes express themselves in built form and that morphology is a superficial expression of process, he also argues that only some adaptations are so-determined. Romanticizing indigenous aesthetics (and stripping indigenous groups of the force of their environmental agency, readily ascribed to the moderns), huts and igloos are determined. Stilted homes, placed on marshes, are ‘morphologically determined’. Even beehives, consistent with Marx’s famous digression on architecture, are determined along ecological lines: “a bee would put many a human architect to shame by the construction of its honeycomb cells.”<sup>149</sup> But while Marx used the beehive to erect a temple to human exceptionalism—“what distinguishes the worst of architects from the best of bees is that the architect builds the cell in his mind before he constructs it in wax”<sup>150</sup>—McHarg sees the beehive as an ideal type. A settlement determined by the constraints of ecological process.

For McHarg, contemporary urbanization was arrogant and morphologically undetermined by natural process; this, to the liberal McHarg, is a product of informational scarcity,

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<sup>148</sup>McHarg, “Ecological Determinism,” 527.

<sup>149</sup>Karl Marx, *Capital*, trans. Ben Fowkes, vol. 1 (1867; repr., London, UK: Penguin Books, 1976), 284.

<sup>150</sup>*Ibid.*, 1:284.

with a sympathy for Descartes's anxiety that the need to decide exerts coercive pressure. Even though professionals responsible for the built environment attempt to "utilize some part of available knowledge, the best of them are pressing for better information, yet action must occur even when information is inadequate."<sup>151</sup> As such, the "first prerequisite for the application of ecology to the planning process is the preparation of ecosystem inventories. This involves the creation of ecological maps at various scales in which communities are identified."<sup>152</sup> The acquisition of informational layers provides the necessary, but insufficient, ground for ecologically determined action. Such action is cognizent of what environmental information reveals: the "megaform of natural processes at the national level, the mezoform of the region, the microform of the city. From the city down to the level of its parts, ecological determinants become participant parameters in the planning process, but still influential as form-giving."<sup>153</sup>

To realize such an informationally-enabled, deterministic planning, McHarg was left to implore "natural scientists, particularly ecologists, to provide the indispensable information which the artificers require ... This information can provide the basis for persuasion in both private and public domains; it can indeed provide the basis for a federal land-use policy based upon natural processes."<sup>154</sup> Note the language here: information is a basis for persuasion, not a window onto unmediated truth. Persuasion, an aesthetic and rhetorical art, is that to which the layered accretion of environmental information aspires.

I note here the degree to which McHarg's determinism clashes with the hesitancy of his mentor Mumford to extrapolate from existing conditions. Indeed, in concluding the

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<sup>151</sup>McHarg, "Ecological Determinism," 529.

<sup>152</sup>Ibid., 529.

<sup>153</sup>Ibid., 538.

<sup>154</sup>Ibid., 537.

conference, Lewis Mumford makes a distinction between two kinds of future. First, the probable. The 'probable' is extrapolative—based on what has been, what will be? What should be? This is held out in contrast to the possible, which is multiplicitous and what Louise Amoore calls 'possibilistic'. The possible future involves an almost unlimited number of outcomes, many of which might be far more desirable than the continuation of existing conditions without end. To wit:

...if you understand the potentialities of a situation, what you may learn from the past [is that you] should stand in the way of it and oppose it to one or another kind of future[.] Otherwise, the future rolls on and we roll with it or under it, as the case may be.<sup>155</sup>

And partially, foreshadowing McHarg's epistemic aspirations to informational globality, the cultivation of a cosmic holism on the part of the intervening subject permits a 'getting on top of', held in opposition to the threatening forces that rumble in the long now.

Man needs the whole cosmos to sustain him. The knowledge of this cosmos and every living part of it enriches him, enables him to know himself for the first time, to have some sense of the further advantages and the further fulfillments that lie ahead of him if once he gets on top of the forces that now threaten his life.<sup>156</sup>

This ambivalence between McHarg's professional who takes their time and Mumford's holistic cosmographer who is aware of the present's latent possibilities raises the ambivalent

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<sup>155</sup>Lewis Mumford, "Closing Statement," in *Future Environments of North America*, ed. F. Fraser Darling and John P. Milton (Garden City, NY: The Natural History Press, 1966), 719.

<sup>156</sup>*Ibid.*, 729.

role of ought anxiety. While circumspection is a good look for the would-be world modifier, it is also an immobilizer and a knowledge bureaucratizer. None of which was inconsistent with the reputation of the Conservation Foundation, an establishment environmentalist institute that pushed scientific and legal reform discourses that buoyed a conservation agenda designed with business in mind.<sup>157</sup> Fairfield Osborne had founded the Conservation Foundation in 1948; Laurance Rockefeller was the foundation's trustee, who gave over \$50,000 per year throughout the middle decades of the 20th century. Gottlieb notes that the vision of environmentalism proffered by the foundation was highly 'expertise-oriented.'<sup>158</sup> Though the organization intermittently experimented with a more activist-oriented approach to conservation, such experiments were quickly quelled. For example, under Sydney Howe's leadership, the organization organized a conference on environmental racism. Howe was quickly replaced by William Reilly, whose a 'more appropriate' leader for an organization whose board was "dominated by Pew, Mellon and Rockefeller Foundation interests."<sup>159</sup> The connections between the Conservation Foundation and the environmental establishment are many. Heads of the EPA—and patrons of McHarg's later career—William Reilly and Russell Train were both former heads of the Conservation Foundation.

Some have argued that accumulating investments by philanthrocapital foundations led to the co-optation of 1960s New Left environmentalism by 1970s elite environmental managerialism, a tension straddled by much of the work occurring in the GSFA. Suggesting that

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<sup>157</sup>Michael Barker, "The Liberal Foundations of Environmentalism: Revisiting the Rockefeller-Ford Connection," *Capitalism Nature Socialism* 19, no. 2 (2008): 15–42, doi:10.1080/10455750802091495; Robert Gottlieb, *Forcing the Spring: The Transformation of the American Environmental Movement* (Washington, DC: Island Press, 1993).

<sup>158</sup>Gottlieb, *Forcing the Spring: The Transformation of the American Environmental Movement*.

<sup>159</sup>Barker, "The Liberal Foundations of Environmentalism: Revisiting the Rockefeller-Ford Connection," 21.

the likes of the Ford Foundation was more interested in political antacid than radical change is uncontroversial; many have explored the role of foundations in sustaining imperialism, setting the terms of academic inquiry, sanding down the sharp edge of injustice, and setting *de facto* policy agendas from outside the circuitry of democratic accountability.<sup>160</sup> Yet it is still jarring to hear it stated explicitly. Michael Barker quotes George Bundy, president of the Ford Foundation from 1966 to 1979 as saying that, “everything the foundation did could be regarded as ‘making the world safe for capitalism.’”<sup>161</sup>

The Ford Foundation Resources and Environment Program which, among other things, would fund two of the first public interest law firms dedicated to environmental issues: the Environmental Defense Fund (EDF), the National Resources Defense Council (NRDC), and the Sierra Club Legal Defense Fund (SCLDF).<sup>162</sup> Though these law firms would receive the majority of the Ford Foundation’s environmental attention (and capital), during this time they would also fund a rather strange pedagogical and disciplinary experiment at the University of Pennsylvania’s Department of Landscape Architecture.

## 2.8 A DEPARTMENT ON THE LAYER MODEL

The first natural scientific arrival on the faculty was Nicholas Muhlenberg in 1963, a resource economist trained at the University of Michigan’s School of Natural Resources and the Yale School of Forestry. Muhlenberg’s charge was to give pedagogical form to McHarg’s intensifying interest in ecology, a task he would approach in a manner informed by prece-

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<sup>160</sup>INCITE, *The Revolution Will Not Be Funded: Beyond the Non-Profit Industrial Complex* (Durham, NC: Duke University Press, 2017); Donald Fisher, “The Role of Philanthropic Foundations in the Reproduction and Production of Hegemony: Rockefeller Foundations and the Social Sciences,” *Sociology* 17, no. 2 (1983): 206–33, doi:10.1177/0038038583017002004; Edward H. Berman, *The Influence of the Carnegie, Ford, and Rockefeller Foundations on American Foreign Policy: The Ideology of Philanthropy* (Albany: SUNY Press, 1984).

<sup>161</sup>Quoted in Barker, “The Liberal Foundations of Environmentalism: Revisiting the Rockefeller-Ford Connection,” 26.

<sup>162</sup>Ibid.



dent. Under a grant from the Conservation Foundation, he examined curricula in resource conservation at his alma maters (Yale and Michigan), as well as the University of California (where he'd previously been on the faculty). These were also institutions that had been supported by the Ford Foundation's Resources for the Future program. We can hear rumblings of what would become McHarg's approach in Stanley Cain's appraisal of the Michigan School of Natural Resources, some of whose success could be attributed to "a faculty with a diversity of professional backgrounds; the present small staff can point to biology, ecology, education, public administration, economic geography, and economics as areas of special competence."<sup>163</sup>

Muelenberg would launch the regional planning program at Penn in the 1965-66 school year as a joint program administered by the Department of Landscape Architecture, the Department of City Planning, and the Department of Regional Science (though regional science's involvement was somewhat nominal). McHarg and Muhlenberg were attempting to articulate their new program, and a new professional identity—then called 'Regional Land Planning'. Such a new discipline required professionals: in hydrology and geology, as well as botany, zoology, and ecology; the last was accorded an exceptionally prominent role as the "the conceptual framework for the inclusion of all the physical and biological sciences." More than a rubric for inclusion, ecology was to so inform the "conceptual basis of [the] prospective profession" that it may as well be called "ecological determinism."<sup>164</sup>

The same philanthropic foundations that were the benefactors of plays at environmental multi-disciplinarity above were also the patrons of the Penn department's experiments

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<sup>163</sup>William J. Cohen, *Ecohumanism and the Ecological Culture: The Educational Legacy of Lewis Mumford and Ian McHarg* (Philadelphia, PA: Temple University Press, 2019), 129–31.

<sup>164</sup>*Ibid.*, 131.

with the same. Early support came from the Ford Foundation, whose environmental work was spearheaded by Gordon Harrison, a program officer in the foundation's Resource and Environment Program (REP). One of the first initiatives the program sponsored under his direction was a 1964 symposium in New York whose speakers articulated an image of practiced and practicable ecological thought capable of addressing complexity and the unintended consequence.<sup>165</sup> Speakers included Paul Sears, Rene Dubos, Edward Deevey, E. Max Nicholson, Frank Fraser Darling, and Ian McHarg. McHarg's contribution was to suggest that ecology might provide a scientific basis for landscape architects and urban planners.<sup>166</sup>

Several years after this conference, in April 1967, Harrison would make a grant of \$200,000 to enshrine a layered form of evidence in the University of Pennsylvania Graduate School of Fine Arts. Ford made the grant on the premise that the Department of Landscape Architecture hire a retinue of natural scientists and develop a curriculum to teach natural science to planners. The fields identified as essential were "meteorology, geomorphology, hydrology, soil science, plant and animal ecology, photo interpretation and remote sensors, computers and computer mapping"; and a search was immediately launched to hire a representative from each field who would contribute to planning studios. These, Penn faculty hoped, would constitute an 'instant center'.

The department's method for solicitating potential hires was somewhat novel. Faculty

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<sup>165</sup>Robert Gioielli, "Foundations and American Environmentalism After World War Two," Rockefeller Archive Center Research Reports Online (Rockefeller Foundation, n.d.).

<sup>166</sup>"Resources and Environment Study - Final Report and Recommendations," Program planning paper (Ford Foundation Office of Policy and Planning, April 1964), Ford Foundation Records, Education and Public Policy Program (EPP), Resources and the Environment, Program Staff Files (FA641). Resources and Environment Study - Final Report and Recommendations, Rockefeller Archive Center; "Resources and Environment Study - Conference Minutes," Program planning paper (Ford Foundation Office of Policy and Planning, February 1964), Ford Foundation Records, Education and Public Policy Program (EPP), Resources and the Environment, Program Staff Files (FA641). Resources and Environment Study - Final Report and Recommendations, Rockefeller Archive Center.

Meteorology	Dr. William Reifsnyder, Yale University
Geomorphology	Dr. John T. Hack, United States Geological Survey
	Dr. Luna Leopold, " " "
	" "
Hydrology	Dr. M. Gordon Wolman, Johns Hopkins University
Soils	Dr. John T. Hack
Plant Ecology	Dr. Robert H. Whittaker, University of California at Irvine
	Dr. F. Herbert Bormann, Yale University
	Dr. George Woodwell, Brookhaven Laboratories
Animal Ecology	Dr. Edward Deevey, NSF and Yale University
	Dr. Lamont Cole, Cornell University
	Dr. Ruth Patrick, Academy of Natural Sciences
Photo Interpretation Remote Sensors	Dr. David Simmonett, University of Kansas
Computers and Computer Mapping	Dr. Waldo Tobler, University of Michigan

*Figure 2.5: Sponsors of candidates for planning positions in the GSFA. Image: Eric Robsky Huntley. Original: Architectural Archives, University of Pennsylvania.*

in the department understood that they were hardly conversant in the natural sciences, let alone capable of assessing the state of the art. As such, the department undertook a rather expensive process by which recommendations were submitted from scientists in each identified natural-scientific discipline these are presented in 2.8. These 'sponsors' and their 'nominees' came to Penn's campus 9-10 March, 1968, the sponsors collectively forming a 'committee' that evaluated the suitability of each candidate for a position in a regional planning curriculum (candidates are presented in fig. 2.6).

A committee assessed each candidate based on their interest in contributing to the ar-

Sponsors, nominees, and their fields are as follows:

Sponsor	Nominee	Field
Reifsnyder	Dr. William Lowry	Meteorology
"	Mr. Bruce Wales	Micro-climatology
Wolman	Mr. Thomas Dunne	Plant Ecology Hydrology
"	Mr. Andrew Godfrey	Geomorphology
Whittaker	Dr. Ronald B. Hanawalt	Soils and Plant Ecology
Deevey	Dr. Estella B. Leopold	Plant Ecology and Paleobotany
Patrick	" " " "	Plant Ecology
Cole	Dr. H. Gray Merriam	Animal Ecology and Population Ecology
Patrick	Dr. John Bradbury	Geomorphology and Limnology
Simmonett	Dr. Phillip Johnson	Remote Sensors, Photo Interpretation, and Plant Ecology
"	Dr. Roger McCoy	Remote Sensors and Geography
Tobler	Dr. Bruce McDougall	Computers and Computer Mapping
McCormick	Dr. Miroslave Grandtner	Vegetation Mapping
"	Dr. Richard Phipps	Micro-climatology and Plant Ecology

Figure 2.6: Nominees for planning positions in the GSFA. Image: Eric Robsky Huntley. Original: Architectural Archives, University of Pennsylvania.

ticulation of the prospective knowledge demanded by planning education and on the applicability of their research to the same. Several candidates were dismissed due to their “rather remote” interests. In one case, a candidate’s “preoccupation with tree tings excluded him from consideration.” Those candidates to whom the positions appealed tended to be those interested in “the prospect that the knowledge contained the various sciences can be employed in useful social work, both in teaching and research.”<sup>167</sup>.

Even at this juncture, it’s strange to note that ‘geography’ is represented primarily as a computational proposition. To constitute their ‘instant center’, McHarg and the GSFA sought the advise of Waldo Tobler and David Simmonette, developers and proponents of computational approaches within geography, proper. These were the only geographers—even at this early date, McHarg conflated the geographic with the computational, somewhat in conflict with his elevation, elsewhere, of Sauer’s regionalism. Despite an avowed affinity for the deep historicity of Sauer, McHarg tended to pursue ‘top’ scholars in a given field, leading to the selection of then-ascendant computational geographers rather than rather more marginal cultural geographers.

Though holism was the aspiration, and layered interdisciplinarity the intention, the ‘instant center’ would only partially materialize. Having selected candidates, the GSFA made a proposal to Harrison at the Ford Foundation for \$1 million to support both hiring and research support. The grant, after some delay, was for only \$500,000. This had consequences for the department’s ability to acquire scientists, which had consequences for the aesthetic completeness of ecological knowledge—each unhired scientist represented a layer

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<sup>167</sup>Ian L. McHarg, “Memo to Ford Foundation,” March 12, 1968, 109.II.A.1.33, Ford Foundation, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

DISTRIBUTION OF FIELDS

	Meteo- rology	Micro- clima- tology	Phys. Geog.	Geo- mor- phology	Hydro- logy	Soils	Pl. Ec.	For.	An. Ec.	Photo. Inter.	Rem. Sen.	Comp. Map.	Cons. Plan.
Deevey									X				
Dunne			x	x	X								
Godfrey				X	x	x							
Hanawalt						X	X						
Johnson							X	x		X	X		x
Leopold							X						x
Lowry	X	x											
Merriam							x		X				x
McDougall			x					x		x		X	
Wales	x	X					x						
<b>Totals</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>3</b>
	<b>Xx</b>	<b>Xx</b>	<b>xx</b>	<b>Xx</b>	<b>Xx</b>	<b>Xx</b>	<b>3X2x</b>	<b>xx</b>	<b>XX</b>	<b>Xx</b>	<b>X</b>	<b>X</b>	<b>3x</b>

X = major field    x = minor field

Figure 2.7: Distribution of nominee fields. Image: Eric Robsky Huntley. Original: Architectural Archives, University of Pennsylvania.

in McHarg's model of relevant planning knowledge. Positions in meteorology, hydrology, and wild life ecology were never filled and, more than that, the budget to support unfunded research vanished. This damaged the prospect of practical interdisciplinarity, as faculty had to pursue funded research within their proper disciplinary homes that precluded collective effort.

As the ecological sciences entered into the discourse and practice of landscape architects at Penn, the less savory associations and applications of those same sciences were also drawn into the environmental mangle. For this reason, I will dwell for a moment on a subsequent appointment to the department's faculty: the South African botanist John F. V.

Phillips. Phillips was noted for his coinage, the 'biotic community', which he enthusiastically applied in the service of South African Apartheid. His work informed that of the nation's prime minister, the ecologist Jan Christian Smuts, and gave Smuts a scientific basis for the construction of state settlements on a segregationist basis.<sup>168</sup> These political entanglements eventually led to Phillip's ejection from the University of Ghana. The appointment at Penn represented his return to academic life after a period of parapatetic consulting for e.g., the World Bank. While the significance Phillips's visiting appointment should not be overstated, it is nevertheless troubling that while McHarg may have not been particularly influenced by Philip's scientific racism, Peder Anker reminds us that he was simultaneously not especially bothered by it.<sup>169</sup>

We can see this in the fact that the student publication of the GSFA, *VIA*, dedicated its first volume in 1968 to "Ecology in Design" in which the editors gave Phillips the tacit honor of the introductory essay. In this essay, we see no explicit acknowledgement of his segregationist politics. Rather, he focuses on a criticism of the failures of insufficiently 'synoptic' and 'holistic' planning approaches. Failures of planning and landscape architecture, he argues, are due to inadequately whole studies of regions; "ad hoc or piecemeal investigations of propositions in planning and landscape architecture inevitably must fail because of their inherent lack of co-ordination and wholeness." Such wholeness was to be accomplished on the basis of "climatic, soil, plant, animal, and human sociological and economic phenomena, and their combinations and permutations of interplay."<sup>170</sup> Such an approach would require

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<sup>168</sup>Peder Anker, "The Politics of Ecology in South Africa on the Radical Left," *Journal of the History of Biology* 37, no. 2 (2004): 303–31, doi:10.1023/B:HIST.0000038258.63985.aa.

<sup>169</sup>Peder Anker, *From Bauhaus to Ecohouse: A History of Ecological Design* (Baton Rouge, LA: Louisiana State University Press, 2010).

<sup>170</sup>John Phillips, "Ecology and the Ecological Approach," *VIA* 1 (1968): 18.

“much time” for “collecting, collating, interpreting and applying this mass of information.” Phillips ends with a positive appraisal of the department in which he served as visiting professor in 1965: that “Professor Ian McHarg and his school in this University” have “already [reflected some light] upon the mosaic of relationships of the environment, the biotic features, and the place of man in the ecosystem.”<sup>171</sup> Integrative knowledge about a region was therefore essential for both McHarg, as a liberal environmentalist attempting to drive decisions with data, and for John Phillips, a South African apartheidist attempting to identify what made a community as such... and therefore justified its existence apart from others.

While integrative knowledge in the natural sciences never took the desired form at Penn, it *did* expand substantially in the early 1970s. Support from the National Institute of Mental Health financed attempts to incorporate the social sciences into McHarg’s layered topology of knowledge.

## 2.9 A THIRD LEVEL OF SYNTHESIS

Sometime in 1973, Richard Wakefield of the National Institute of Mental Health (NIMH) gave McHarg a phone call. This was not McHarg and Wakefield’s first encounter; they had undertaken their Master of City Planning degrees at the same time at the Harvard Graduate School of Design. McHarg remembers their phone call like this:

[Wakefield] said, ‘Ian, I bought your book and I love it.’ He said, ‘but you realize you absolutely left out any reference to man?’ I said ‘yes’ He said, ‘did you do it consciously?’ I said ‘yes.’ He said, ‘why?’ I said ‘because all the social science I learned at Harvard University is either oblivious to the environ-

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<sup>171</sup>Ibid., 18.



ment, ignorant about it, or antithetical to it.' All the economics I got from John T. Galbraith, Schumpeter, John T. Black, Schumpeter [sic], Seymour Harris, all the bloody lot of them, was absolutely antithetical to the ecological view. I couldn't incorporate this bloody stuff ... And the sociologists were absolutely no better because first of all they knew nothing about the environment. ... So I said 'these bastards don't know anything about the environment and they don't know much about people either!' He said, 'Ian, don't you agree we have to know about people?' I said, 'it's a great idea, I just don't know how you're going to do it.' He said, 'I'll give you a million if you try.' I said, 'for a million? I'll give you my impression of Shirley Temple.' So I wrote down a proposal. And I said we're going to have to do this the same incremental way we did the natural sciences. We start from the beginning, all the same, we'll make our way forward. So let's operate under the assumption that geomorphology integrates the physical sciences. Ecology integrating the biophysical sciences is the way in which we now have an integrated view of biophysical and social systems. So we said we'll operate under the assumption that ecology is our point of departure and we've got to introduce behavior. ... We've got to introduce behavior because that's a critical adaptive device.<sup>172</sup>

For McHarg, the incorporation of behavioral layers came to represent a 'third level of synthesis'. The first was provided by geomorphology, figured as a science which integrates all other physical processes of the environment; meteorological, geological, geomorpho-

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<sup>172</sup>Ian L. McHarg and Carl Steinitz, *Dialogue and Debate: A Series of Conversations About Landscape Architecture*, interview by Bruce MacDougall, 1991, GSD Archival Tapes 1991.11.19 VHS, GSD Archive Collections, Frances Loeb Library Special Collections, Harvard Graduate School of Design, Cambridge, MA, n.p.

logical, hydrological, and soil processes that are likely to be reflected in earth forms. The second level suggested how plant and animal ecology were determined by geomorphology and co-constituted. Social science, for McHarg was the third: instrumentalized ethology and ethnography, deployed as means of understanding behavior as an adaptive device.

Though McHarg makes Wakefield's 1963 call sound like an event out of the blue, he had been engaged in a community of scholars around mental health and the urban environment for several years prior: the Committee on Environmental Variables and Public Health of the National Institutes of Mental Health, also known as the 'space cadets.'

Geographers, particularly historians of the discipline, have recorded the story of our so-called 'space cadets'—the 'Garrison raiders'—that built a quantitative (or mathematical) geography with great difficulty at the University of Washington.<sup>173</sup> It was not only geographers, though, who imagined themselves in astronaut suits. Another set of 'space cadets' were forging quite a different vision of urban study in Washington, DC and Baltimore: the NIMH Committee on Physical Environmental Variables as Determinants of Mental health or, from 1958 on, the Conference on Ecological Manipulation of Mental Health.<sup>174</sup> Members of the group would be known to each other as the 'space cadets', after one member, upon seeing Sputnik, that "if people think the Russians are out in space, they should see

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<sup>173</sup>Trevor J. Barnes, "Placing Ideas: Genius Loci, Heterotopia and Geography's Quantitative Revolution," *Progress in Human Geography* 28, no. 5 (2004): 565–95, doi:10.1191/0309132504ph5060a; Trevor J. Barnes and Matthew Farish, "Between Regions: Science, Militarism, and American Geography from World War to Cold War," *Annals of the Association of American Geographers* 96, no. 4 (2006): 807–26, doi:10.1111/j.1467-8306.2006.00516.x.

<sup>174</sup>Edmund Ramsden and Jon Adams, "Escaping the Laboratory: The Rodent Experiments of John B. Calhoun and Their Cultural Influence," *Journal of Social History* 42, no. 3 (2009): 761–92, doi:10.1353/jsh.0.0156; *ibid.*; Ellen Shoshkes and Sy Adler, "Planning for Healthy People/Healthy Places: Lessons from Mid Twentieth Century Global Discourse," *Planning Perspectives* 24, no. 2 (2009): 197–217, doi:10.1080/02665430902734301; Evelyne de Leeuw, "Cities and Health from the Neolithic to the Anthropocene," in *Healthy Cities: The Theory, Policy, and Practice of Value-Based Urban Planning*, ed. Evelyne de Leeuw and Jean Simos (New York, NY: Springer, 2017), 1–30.

us”<sup>175</sup>.

Much of McHarg’s subsequent career—and his vision for computerized knowledge-layers—would be constructed along the lines of the interdisciplinarity imagined here: what psychiatrist Leonard Duhl and convener of the cadets would call ‘a new way of viewing bigness’. The influence of the disciplines assembled was profound: viewing McHarg’s 1969 documentary, *Multiply and Subdue the Earth*, it’s hard to miss the reference to the famous Calhoun rat studies, which linked urban density with degeneracy through an analogy to constructed ‘rat universes’. McHarg first encountered Calhoun with the work of this second group of space cadets, funded by Calhoun’s National Institute for Mental Health.<sup>176</sup>

The space cadets met twice a year from 1954-1966, generally in DC, and generally at the offices of the NIMH or the Dupont Plaza Hotel. The group made the most cohesive statement of their collective intention and understanding during the Thirty-Ninth Annual Meeting of the American Orthopsychiatric Association in March 1962, a professional organization receptive to interdisciplinary studies of the relationship between social context and the practice of orthopsychiatry (the branch of psychiatry concerned with mental health in early childhood). These presentations were collected in the 1963 text *The Urban Condition: People and Policy in the Metropolis*. Duhl’s introduction to the volume is a manifesto for interdisciplinarity that would permit “a new way of viewing complexity, of viewing bigness, and unravelling confusion.”<sup>177</sup> The confusion and bigness that was to be the object of

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<sup>175</sup>Laura Jane Martin, “Space Cadets and Rat Utopias,” *The Appendix* 2, no. 3 (2014), <http://theappendix.net/issues/2014/7/space-cadets-and-rat-utopias>; Nicholas Lemann, “The Unfinished War,” *The Atlantic*, January 1989, <https://www.theatlantic.com/past/docs/politics/poverty/lemunfl.htm>.

<sup>176</sup>Edmund Ramsden, “From Rodent Utopia to Urban Hell: Population, Pathology, and the Crowded Rats of NIMH,” *Isis* 102, no. 4 (2011): 659–88, doi:10.1086/663598.

<sup>177</sup>Leonard J. Duhl, *The Urban Condition: People and Policy in the Metropolis* (New York, NY: Simon and Schuster, 1963), viii.

this enterprise was the so-called urban crisis, which was understood to be a “crisis of size, complexity, and of the large and varied administrative structures that are around us”; the consensus view was that, despite that analytical usefulness of specialization, the urban was a type of problem that “one cannot deal with... in parts.”<sup>178</sup>

However, while the University of Washington ‘space cadets’ saw the answer in broadly mathematical models, the DC ‘space cadets’ were less optimistic about the prospects of rational decision-making, though neither are they dismissive of its potentialities. They phrase the problem in this way:

On the one hand, there is a widespread view that if man [sic] could be neatly compartmentalized and structured, and his society with it, man’s [sic] own rationality could bring him out of confusion and complexity. It is in response to this desire that the great organized technical machinery is developing. The giant computer, the new mechanism developed by the Department of Defense for metering their programs and coordinating their activities, is just the beginning of the massive use of our technological tools to bring some order out of chaos.<sup>179</sup>

However, Duhl was also pessimistic about the prospect of this rationalizing impulse to obviate human judgement. Duhl recalled John Glenn’s skillful use of manual overrides

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<sup>178</sup>Ibid., viii.

<sup>179</sup>Ibid.,viii; On the development of military control systems, see Paul N. Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: The MIT Press, 1996); Oliver Belcher, “Data Anxieties: Objectivity and Difference in Early Vietnam War Computing,” in *Algorithmic Life: Calculative Devices in the Age of Big Data*, ed. Louise Amoore and Volha Piotukh (London: Routledge, 2015), 127–42, 10.4324/9781315723242-17.

and judgements that conflicted with instrument readings during his flight of the somewhat glitchy *Friendship 7* spacecraft during the Mercury-Atlas 6 spaceflight.

On the other hand, as has been so beautifully demonstrated by the flight of Colonel Glenn, all the technical machinery in the world cannot replace the human being and his [sic] ability to make judgements. Despite, and in part, because of the high development of technology, there is a tremendous need for a new understanding of the needs of men [sic], of the rational and irrational in human behavior, and of the ways in which human judgement is determined by a host of internal and external forces.<sup>180</sup>

This more improvisatory relationship to reason was due in part to their focus on a “long-neglected question: *How does one take what is known and turn this into social policy and social action?*”<sup>181</sup>

Given that Duhl was previously a guest on McHarg’s interview series *The House We Live In*, it was not a surprise that for the most part McHarg’s contribution to the edited volume that summarized the activities of these ‘space cadets’ largely reprised the broad religious analysis of that series. Lynn White, though not explicitly cited, is clearly in the atmosphere:

[Human] religions, philosophies, ethics, and acts have tended to reflect a slave mentality, alternatively submissive or arrogant toward nature. Judaism, Christianity, Humanism tend to assert outrageously the separateness and dominance of man over nature, while animism and nature worship tend to assert total sub-

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<sup>180</sup>Duhl, *The Urban Condition: People and Policy in the Metropolis*, viii.

<sup>181</sup>*Ibid.*, x.

mission to arbitrary nature. ... Can modern man [sic] aspire to the role of agent in creation, creative participant in a total, unitary, evolving environment?<sup>182</sup>

If religions, in the same measure as humanism, had brought about ecological ruin, the only remaining pattern for thought is to fall in line with the misanthropic vision of the mid-century neo-Malthusians.

The nuclear cataclysm is over. The earth is covered with gray dust. In the vast silence no life exists, save for a little colony of algae hidden deep in a leaden cleft long innured to radiation. The algae perceive their isolation; they reflect upon the strivings of all life, so recently ended, and on the strenuous task of evolution to be begun anew. Out of their reflection could emerge a firm conclusion: 'Next time, no brains.'<sup>183</sup>

So, by the time Wakefield called, McHarg had already been inducted into flourishing social scientific forms of inquiry. Wakefield was also moving within this milieu: he was a plans and process analyst at the NIMH Center for Metropolitan Programs, which had funded the Center for Urban Ethnography at the University of Pennsylvania.<sup>184</sup> Wakefield was also proximate to NIMH officials that maintained close ties to the 'space cadets'; the assistant chief of the Center for Metropolitan Problems was a psychiatrist named Matthew Dumont, author of *The Absurd Healer*, who was mentored by Leonard Duhl, leader of the cadets. In Duhl's Foreword to *The Absurd Healer* he wrote of the ameliorative, adaptive

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<sup>182</sup>Ian L. McHarg, "Man and Environment," in *The Urban Condition: People and Policy in the Metropolis*, ed. Leonard J. Duhl (New York, NY: Simon and Schuster, 1963), 44–45.

<sup>183</sup>Ibid., 58.

<sup>184</sup>Gerald F. Vaughn, "Sheffield's Richard P. Wakefield: Advocate for Human Values, World Futures, and the Environment," *Historical Journal of Massachusetts* 32, no. 2 (2004): 18.

promise of ecological models: that society was not “so sick that it must be destroyed by revolution or other means”; that society was “capable of revitalizing and retooling itself”<sup>185</sup>

If McHarg had emerged from Harvard disdainful of the social sciences, Wakefield had followed his training in urban planning into a series of jobs that put him in contact with the group dynamics and systems thinking approaches that were beginning to percolate out of select centers of calculation. While at the US Post office, he collaborated with researchers at the University of Michigan’s Institute for Social Research, a behavioral science powerhouse that succeeded the MIT Group Dynamics Research Center following the death of its founder, Kurt Lewin, in 1947. Following his time at the U.S. Post Office, he worked at General Electric in its Operations Research and Synthesis section. Between 1967 and 1979, he was part of an informal group (‘the Graves Group’) influenced by Clare Graves; Graves became influential in development psychology as the originator of a theory that suggests that human ‘values’ are determined by an individual’s psychic state of being, which takes ‘quantum-like jumps’ between steady-states towards maturity.<sup>186</sup> And, finally, he was also the organizer for many years of the Ad Hoc Interagency Committee on Futures Research, a committee comprising civil servants interested in future studies, then emerging as field in its own right.<sup>187</sup>

Over the course of the 1970s, McHarg would construct a social science contingent in the department with the support of NIMH. Even more than the natural sciences, these positions were a revolving door. They began by hiring Yehudi Cohen, an anthropologist who had for-

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<sup>185</sup>Matthew P. Dumont, *The Absurd Healer: Perspectives of a Community Psychiatrist* (New York, NY: Viking Press, 1971), 14.

<sup>186</sup>Clare W. Graves, “Levels of Existence: An Open System Theory of Values,” *Journal of Humanistic Psychology* 10, no. 2 (1970): 131–55, doi:10.1177/002216787001000205.

<sup>187</sup>Hyeonju Son, “The History of Western Futures Studies: An Exploration of the Intellectual Traditions and Three-Phase Periodization,” *Futures* 66 (2015): 120–37, doi:10.1016/j.futures.2014.12.013; Vaughn, “Sheffield’s Richard P. Wakefield: Advocate for Human Values, World Futures, and the Environment.”

malized theories of human adaptation; he was followed by a series of anthropologists before Dan Rose and Setha Low were hired to develop methods for incorporating social scientific knowledge into planning decisions; namely, to address the scalar problem that group identification for planning was not obviously translatable to the individual scale understood as essential to design.<sup>188</sup> The social scientists faced institutional difficulties, though. Low was denied tenure; some narratives suggest that it had to do with the University's oversupply of the discipline (though not within the landscape architecture department).<sup>189</sup> The same befell Jon Berger, though he would remain closely bound to McHarg as a founder of Expert Information Systems, a GIS consultancy McHarg joined in his later years. This ground is covered in the next chapter.

The professional difficulties faced by the social scientists aside, by the end of the 1970s, McHarg had constructed a department that was, to put it mildly, highly unusual in its disciplinary configuration. For all intents and purposes, there was a single landscape architect or planner on staff: McHarg. And the content of the discipline, in advance of the scientific intervention McHarg staged, was largely cored out in favor of a model of practice that imagined the designer as a convener of many disciplines, a synthesizer of integrative information. A *Science* profile in 1977 proves the point, describing him as “one of the few genuinely interdisciplinary thinkers around”, an “iconoclast, guru, and synthesizer.”<sup>190</sup> Evidence provided is a list of disciplines present in Penn's regional planning and landscape architecture department—geologist, ethnographer, medical anthropologist, geochemist, hydrolo-

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<sup>188</sup>Setha M. Low, “Social Science Methods in Landscape Architecture Design,” *Landscape Planning* 8, no. 2 (1981): 137–48, doi:10.1016/0304-3924(81)90031-9.

<sup>189</sup>Ian L. McHarg, “Landscape Architecture and Regional Planning at the University of Pennsylvania,” 1980, 109 II.C.50, Landscape architecture and regional planning at the University of Pennsylvania [1980], Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>190</sup>Holden, “Ian McHarg: Champion for Design with Nature,” 379.



gist, soil scientist, plant ecologist, limnologist, and resource economist. The promise of the department was represented with recourse to lists of disciplines, each comprising a layer in an aesthetic model of evidence, convened to ensure that plans produced by the department carried the force guaranteed by wholeness.

Even in this article for a scientific publication, the scientific work done by the department was framed rhetorically. The appearance of a scientific scaffolding added persuasive force to the argumentation of the adversarial political actor.

The kind of planning I do is most efficacious for adversary groups ... people who are going to be screwed by something or other, whether its a dam or a highway or a transmission line or an atomic reactor. Their success is contingent on having more information than the adversary. Ecological planning is a way to get more information—by and large these great, brutish adversaries are so arrogant but they are also careless—they really don't do their homework.<sup>191</sup>

However, despite the triumphalist narrative of internal histories and magazine profiles, the form of evidence developed in the department was beginning to exceed its ability to ensure its own coherence. Alongside disciplinary multiplication, McHarg was intermittently making advances towards geocomputation; this was, in part, to ensure the coherence and validity of an epistemic aesthetic, though initially their demonstrable success was modest.

We can see the form taken by McHarg's computational ambitions in a documentary produced years earlier. He was enlisted as a consultant and partial narrator of a documentary entitled *Multiply and Subdue the Earth*, cited briefly above, which was produced under

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<sup>191</sup>McHarg quoted in *ibid.*, 381.

the auspices of the WGBH Educational Foundation for the National Educational Television and Radio Center's Public Broadcast Laboratory. Austin Hoyt, a WGBH director who had received a grant from the Ford Foundation, wrote and produced the documentary.<sup>192</sup> The documentary's conclusion, after winding through familiar McHargian arguments about industrial rapaciousness and its despoilation of the environment, concludes with a hopeful prognosis regarding what might be possible with computer technology:

one day, it's going to be possible to store all the information in computers and ask the computer to find any city we dream of. To be able to ask it to find areas of inordinate beauty and intrinsic suitability for all the land uses that should compose a city. All the recreational delights and water and foundations and every other conceivable thing. And out of this glorious computer will print this marvelous map which will reveal just exactly that which we want to know.<sup>193</sup>

All of this, unsurprisingly, bled into an almost parodically liberal conception of social change. For McHarg, such maps would allow for a genuine "environment of choice", informed by "an ecological inventory of the entire country" that would "find out what the land offers in terms of environmental choices". Maps would inform liberal subjects of the plentiful pathways toward positive environmental development. While technological change, industrial revolution, and scientific specialization had produced vast despoilation, those same sciences could be deployed to "understand and respect nature. To learn the degree to which we can safely intervene in our environment."<sup>194</sup>

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<sup>192</sup> *Multiply and Subdue the Earth* (WGBH Educational Foundation, 1969); McHarg, *A Quest for Life: An Autobiography*, 204; Let this also serve as a corrective: McHarg was not, as is frequently claimed, the writer or director of this documentary.

<sup>193</sup> *Multiply and Subdue the Earth*.

<sup>194</sup> *Ibid.*, n.p.

Such approaches were pragmatic; McHarg speaks as an activist spurned, who had “spent years of [his] life offering my palpating heart to people who couldn’t care less and you know, by and large, the natural instinct is to stomp on palpating hearts.”<sup>195</sup>

It seems to me that one really needs to have two things: you want not only to be able to say ‘don’t,’ but to be able to say ‘do.’ ... So tediously and slowly, we mapped this fantasy. And remember that we didn’t know the answer as we proceeded. But finally we assembled all of this information and there it was, down.<sup>196</sup>

Mapping, imagined computerizably, was a way of hardening the evidence, of evading the problem of the palpating heart. The prospect of mapping, computationally was equivalent to the prospect of the ecological inventory at enormous scales.

Happily, recent technological advances facilitate these. Earth satellites with remote scanning devices with high-level air photography and ground-level identification can provide rich data and time series information on the dynamism of many natural processes. ... These inventories would then constitute a description of the world, continent, or ecosystem under study as phenomena, as interacting process, as a value system, as a range of environment exhibiting degrees of fitness for organisms, men and land uses.

These would allow results to be “searched for concurrences from which emerges a social program for a new urban America.”<sup>197</sup> A program would—or should—deterministically fol-

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<sup>195</sup>Ibid., n.p.

<sup>196</sup>Ibid., n.p.

<sup>197</sup>McHarg, *Design with Nature*, 197.

low from the map. The first of these experiments was a project in the Philadelphia Metropolitan Area under the auspices of a Urban Renewal Demonstration Grant by the Urban Renewal Administration.

#### 2.10 COMPUTERIZING THE LAYER

The project—funded by a Urban Renewal Demonstration Grant awarded by the Urban Renewal Administration, under the provisions of Sect. 314 of the Housing Act of 1954 and supported by the State of New Jersey’s Department of Community Affairs as well as the Pennsylvania State Planning Board—was subsequently published as *Metropolitan Open Space and Natural Process*.<sup>198</sup>

Nohad Toulan, then a PhD student at Penn, would carry out this early computational study.<sup>199</sup> The metropolitan area was subdivided into 14,048 square grid cells of a quarter square mile each, based on the Penn-Jersey Transportation Study for reasons of comparability. The sheer volume of cells suggested that the project would devolve into a “fantasy of planimetry”, were it not for the the project’s key innovation:

the discovery that the photo electric cell is adaptable and can be used to measure reflected and incident light. By making an negative of each parameters, of which the parameter itself is black against a white background, and knowing the total area of the metropolitan region, it is possible to determine the area covered by each parameter.<sup>200</sup>

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<sup>198</sup>David A. Wallace et al., *Metropolitan Open Space and Natural Process*, ed. Nohad A. Toulan and David A. Wallace (Philadelphia, PA: University of Pennsylvania, 1970).

<sup>199</sup>By the time the report was published, Toulan had finished his PhD, returned to Egypt, and taken a position as Director of Urban Planning for Greater Cairo. This was prior to launching a long academic career at Portland State University, whose school of College of Urban and Public Affairs now bears his name.

<sup>200</sup>*Ibid.*, 32.

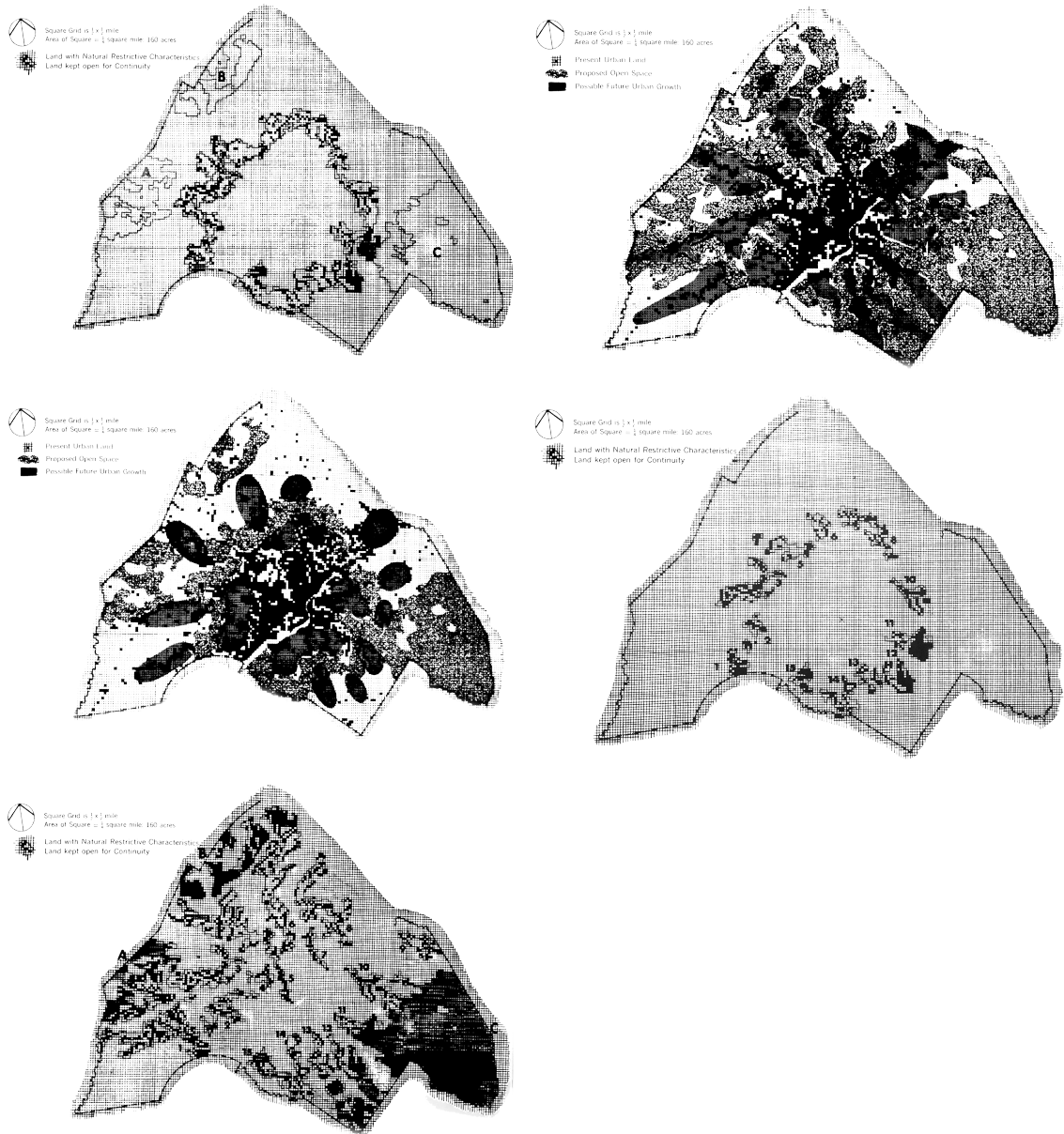


Figure 2.8: Maps of possible futures, imagined on a rectilinear grid on the basis of calculated parameters, formed the basis for Metropolitan Open Space and Natural Process, Wallace et al., 1970.

These values were subsequently rounded to the nearest ten percent and transmitted to IBM punchcards for calculation.<sup>201</sup>

The published volume that carries the results of this study reproduces the gridded maps

<sup>201</sup>Nohad A. Toulan, "Appendix: Methodology for Chapter II," in *Metropolitan Open Space and Natural Process*, ed. David A. Wallace (Philadelphia, PA: University of Pennsylvania, 1970), 190.

that became the basis for areal calculation (see fig. 2.8). Though this experiment was a modest success, others were less so. McHarg's department hired its first computer scientist, Bruce MacDougall, in 1969. While his tenure was characterized by modest optimism, it was also bound up in a rather serious pedagogical catastrophe that would lead McHarg to avoid computational pedagogy until the 1980s. MacDougall had arrived as part of the Ford Foundation-led hiring process in 1969, the geographer and computer scientist recommended by Waldo Tobler, then of the University of Michigan.<sup>202</sup> In that year, he began teaching the GSFA's first class in spatial computation, called 'Computer Programming for Spatial Problems'; he would continue to teach this class until his departure in 1974.

The felicity of this computational dream, however, clashed rather extremely with its implementation during MacDougall's tenure. According to Anne Whiston Spirn, McHarg had attempted to teach a required regional planning studio using computational methods in 1969-70 with the support of MacDougall. This was a debacle. Spirn shared that of the 20-30 students that began the program in 1969-70, all but three or four left in protest—not the class, but the program—having spent the year combating technical difficulties. The attempt to introduce computation to regional planning students in the general curriculum led to mass attrition, turning the department into what Spirn calls a 'ghost town'. Given this experience—which "McHarg didn't want to talk about"—it is not a surprise that there was no substantive computation instruction in the Department between MacDougall's departure in 1974 and the early 1980s.

Despite this pedagogical misfire, graduate students nevertheless began doing substantial

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<sup>202</sup>Cohen, *Ecohumanism and the Ecological Culture: The Educational Legacy of Lewis Mumford and Ian McHarg*.

computational work under the tutelage of MacDougall. McHarg recalls the induction of Lewis Hopkins's induction as follows:

He came up to me one day, it was at the beginning of one of the [LARP 501] studios, and he said 'Mr. McHarg, what you're doing is entirely rational.' Nobody had every accused me of being rational in my whole life; passionate maybe, tempestuous maybe, aggressive maybe, abrasive certainly, but rational nobody had ever said. I said, 'is this true?' He said 'yes, it is absolutely amenable to the computer. Would you mind if I try and apply it?'<sup>203</sup>

Hopkins would subsequently work with WMRT and MacDougall to develop a 'very rich' dataset describing the region near Wilmington, Delaware for a 1973 highway routing project. McHarg describes this project as his "initiation into computerized ecological planning". Using a grid-cell based approach like that used in the Metropolitan Open Space study, but supplemented by the computerization of rudimentary map algebra, they developed a method for identifying routes.<sup>204</sup> Lewis also developed algorithmic route selection methods in the context of a dissertation and series of articles under the tutelage of the regional scientist Brit Harris, who was on the city planning faculty.<sup>205</sup> A 1979 interview internal to Penn brags that Bruce MacDougall's departure produced a department chair at the University of Massachusetts, Amherst. Asked during this same interview about future

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<sup>203</sup>Ian L. McHarg, Interview, June 16, 1989, 109.V.D4.66.1, Interview with Ian McHarg, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>204</sup>McHarg, *A Quest for Life: An Autobiography*, 338–39; William J. Cohen, "A Critical Assessment of Ian McHarg's Human Ecological Planning Curriculum at the University of Pennsylvania" (Dissertation, University of Pennsylvania, 2003).

<sup>205</sup>Lewis D. Hopkins, "Design Method Evaluation—an Experiment with Corridor Selection," *Socio-Economic Planning Sciences* 7, no. 5 (1973): 423–36, doi:10.1016/0038-0121(73)90040-2; Lewis D. Hopkins, "Methods for Generating Land Suitability Maps: A Comparative Evaluation," *Journal of the American Institute of Planners* 43, no. 4 (1977): 386–400, doi:10.1080/01944367708977903.

plans for computation, he laments the same loss; a strong capability represented by Bruce MacDougall and Lewis Hopkins, was unable to realize “the hope of a fully computerised ecological planning.”<sup>206</sup>

## 2.11 CONCLUSION

Even alongside these specifically computational difficulties, student unrest was beginning to boil over. In 1984, as computation was taking its place among department requirements, a group of 27 students LARP students signed onto a letter highly critical of department practice and pedagogy; among these students was James Corner, who would eventually assume the chairpersonship at Penn after being hired on as a lecturer by Anne Whiston Spirn, and whose firm James Corner Field Operations would become a sought-after designer of public spaces, e.g., New York City’s High Line.<sup>207</sup>

These students “experienced extreme confusion and anxiety.” They felt the studio’s instruction lacked “clear statements of goals and requirements” or “explanation of methods” and that much could be done to improve the “structure and coordination within our interdisciplinary program,” including addressing the “distinct lack of communication among professors and therefore a lack of coordination of our classes.” Students were furthermore highly distressed about instructional quality, arguing that “some has been below par, some practically non-existent.” There was also some concern about how little room was left for discussions of the politics and ethics of future-making.

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<sup>206</sup>Ian L. McHarg, interview by Hollander, 1979, 109.V.D.4.40, An interview with Ian McHarg (1979), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA, n.p.

<sup>207</sup>For a critical-geographical analysis of the High Line, see Nate Millington, “From Urban Scar to ‘Park in the Sky’: Terrain Vague, Urban Design, and the Remaking of New York City’s High Line Park,” *Environment and Planning A* 47, no. 11 (2015): 2324–38, doi:10.1177/0308518X15599294.



Members of both [the landscape architecture and regional planning] programs feel there is need for more time for us to participate and share our expertise, experiences, ethics, and politics, and visions of the future we are designing.<sup>208</sup>

It should also be said that this letter raises concerns about sexist and racist comments from faculty, a revelation that is not entirely surprising. Stories about McHarg's sexism and proclivity for the verbal harassment of female students circulate widely among his contemporaries. Masculinism and misogyny in design training has long been an open secret in the professions; while the task of this essay is not to exhume McHarg's complicity in these exploitative regimes, it would be irresponsible to not recognize that the figure to which I am primarily addressed is problematic in at least this way.

The sentiments voiced in the letter above should be viewed in the context of on those voiced by a smaller collection of students in the late 1970s or early 1980s—the letter is undated. Students in the same introductory studio wrote a letter complaining of the outsized emphasis on rote cartographic production. It was not made clear, according to these students, how it was that their cartographic striving related to the complex problems of planning. The productivist rolling-out of maps elided the difficulty of their substance:

Cartography continues to dominate our studio. We receive no problem statement nor any sense of the validity of the end product towards which we are working. ... This is not an age of faith, yet we are asked to unconditionally embrace an approach without any discussion of its limits. ... Isn't it sometimes more important to comprehend the complexity of a concept before simplisti-

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<sup>208</sup>Ali Atwa et al. to Ian L. McHarg, 1984, 122 I.51, Fall 1984, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

cally plotting data? ... [we have not] received a sense of the inter-relationship between data collection, planning, and design.<sup>209</sup>

These students speak to the danger posed by adherence to a program of rhetorical evidence-weilding; that without care and caution, forms of evidence can become evidentiary formalism. Epistemic aesthetics may lapse into aestheticized epistemology. McHarg wielded the layer rhetorically to establish expertise and credibility; but even as it functioned rhetorically to elevate his practice, it also functioned pedagogically to constrain discussion, to cleanse it of difficulty and politics. The layer is a form of evidence that was widely adopted in the liberal state and was consistent with the broad aim of bureaucratized environmentalism: to professionalize the energies of ecological activists and dull their radical edges.

In the work of McHarg, the horizontal extent of environmental knowledge was upscaled alongside increasing geocomputational power. In the following chapter, I move from an analysis of the means by which evidence was combined, to an analysis of the means by which evidence becomes extensive: a globe which includes the full extent of the earth.

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<sup>209</sup>Arthur Haines et al. to Faculty of the Department of Landscape Architecture, n.d., 109 ILE.1.129, Student Letter to Faculty: Faculty-Student Communications, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

*Making Geocomputation Global*

The view of the earth from the moon had a profound effect on me. I had gravitated in scale from local projects to metropolitan regions, river basins, and finally, the continent, but now it became apparent that I must begin to address the environment of the earth. Uncertain of what I could do, it would be enough to reserve a compartment in the mind identified with the entire earth.

—Ian McHarg, *A Quest for Life* (1996)

On a late September morning in 2019, I found myself standing alongside a hundred or so others in the Kresge Oval at the Massachusetts Institute of Technology (MIT). We were standing between three idiomatic fixtures of high modern architecture—to our north, the brutalist Stratton student center, designed by Eduardo Catalanom. To our west, Eero Saarinen’s Kresge auditorium arched its spine; just south was Saarinen’s Chapel, a small space of interfaith interiority and individualized religious intensity.<sup>1</sup> The chant caller took to the steps alongside the student center and began to extract political speech from the assembled engineers (“What do we want!?” “..” “When do we want it?” “..”). A small but resolute collection of students gathered email addresses in support of a reinvigorated MIT Divest campaign fig. 3.2. As I took the clipboard and made affirmative chit-chat, I was struck; that between these buildings that had once served as symbolic anchors for a strong, scientific, and secure liberal order, the institute was walking out on itself. A climate strike had been called, and many who made their professional home in one of the primary incubators of technoscientific dreams had joined the picket line.

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<sup>1</sup>Joseph M. Siry, “Tradition and Transcendence: Eero Saarinen’s MIT Chapel and the Nondenominational Ideal,” in *Modernism and American Mid-20th Century Sacred Architecture* (London, UK: Routledge, 2018).



*Figure 3.1: The climate strike gathers on Kresge Oval at MIT. Photo by Eric Robsky Huntley.*

We began the procession, our voices building steam, bouncing off the concrete walls of building 13, building 31, building 24, building 12, and building 26. As we passed the Koch Institute for Cancer Research (building 76), named for the reactionary petrochemical dynasty, a pause and a chant: “un-Koch MIT!” (Our route did not pass the MIT David. H. Koch Childcare Center, building W64.) We moved through Kendall Square and crossed the Longfellow bridge. I the poem that had earned Longfellow the honor of the bridge’s name. He had written in 1845 of crossing the current span’s predecessor, the West Boston bridge:

And I think how many thousands  
Of care-encumbered men [sic],  
Each bearing his [sic] burden of sorrow,  
Have crossed the bridge since then.  
I see the long procession



Figure 3.2: A banner drop in Building 7 by Divest MIT in the weeks following the climate strike. Photo by Eric Robsky Huntley.

Still passing to and fro,

The young heart hot and restless,

And the old subdued and slow!<sup>2</sup>

Our long procession of the care-encumbered crossed the Longfellow and joined tens of thousands at Boston's City Hall Plaza. We set up camp on a ledge overlooking the plaza. City Hall loomed, a paean to the the public sector erected during a moment of great optimism. All of these slabs of concrete. All of these angry bodies. We screamed for movement; the buildings around us responded in the architectural language of solidity and permanence.

<sup>2</sup>Henry Wadsworth Longfellow, "The Bridge by Henry Wadsworth Longfellow," *Poetry Foundation*, 1845, <https://www.poetryfoundation.org/poems/50463/the-bridge-56d22d989abbc>.

But neither the buildings nor the bridge were the most enormous object present that morning. Depending on how you analyzed the signs, speeches, chants, shirts, and logos, that title would go to the planet, to the climate, or to capitalism. The three, that day, were intermingled. “Planet over profit.” “Earth is not expendable.” “What about us?”: the ‘o’ of ‘about’ was replaced with a globe. “Don’t burn my future earth.” “There is no planet B.” While many held signs that recycled the language of planetary salvation, inherited from past environmental movements (‘save our earth’), it was hard to escape the sense that this was an oversight misaligned with the collective sentiment: it was not only that the planet was in distress. It was an actor, an agitator, and an event around which we were rallying and demanding action.

Amidst the globes and bullhorns, were calls for action. I held a sign that read “End Fossil Capitalism”; my colleagues held signs suggesting that we “decarbonize our economy”; that “we have the tech. We need the will.” Many of those that stick in my memory, though, are those written in the language of empty imperative: “do something.” We held ourselves in anxious anticipation of an earth more volatile; the anxiety of knowing what was happening created a sense of urgency requiring forceful certainty. Scientists had spent decades making the earth speak about what was ailing it, and double-checking their translation work.<sup>3</sup> The problem it vocalized—that greenhouse gasses were driving up surface temperatures—had made the planet the star of a major political drama in which the description of a dire reality made it impossible to not do *something*, and soon.

I was still thinking about the strike and its images of planetary emergency several weeks later, when I came across a geodesic dome occupied by a pillow fort in Somerville, Mas-

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<sup>3</sup>Paul N. Edwards, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming* (Cambridge, MA: The MIT Press, 2010); Jennifer Gabrys, *Program Earth: Environmental Sensing Technology and the Making of a Computational Planet* (Minneapolis, MN: University of Minnesota Press, 2016).



*Figure 3.3: The climate strike on City Hall Plaza in downtown Boston. Photo by Eric Robsky Huntley.*

sachusetts's Davis Square. Extinction Rebellion (XR) activists had descended upon the Honk! Festival, the nation's largest annual gathering of activist street bands. Between die-ins, I block-printed the XR logo on a scrap of canvas. To inscribe the logo is to enjoy a simple, geometric act: nest an hourglass in a circle. Remind yourself that the conditions of the earth now measure time; the planet has attained a new political temporality and the ability to speak, at least well enough to say: "time's up."

This chapter turns on the relationship between representations of the planet and an anticipated future ecology that makes demands. I return to the work of Ian McHarg to ask a question about rhetoric and the scale of evidence. At the end of the previous chapter, we saw McHarg turning towards computation. I now give sustained attention to what computation was understood to do: extend the horizontal remit of ecological planning and establish a new unit landscape for urban planning and design.<sup>4</sup> Geocomputation was a means by

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<sup>4</sup>I borrow the language of "unit landscape" from Garrett Dash Nelson, see "A Place All Together: Planning



Figure 3.4: Extinction Rebellion logo block printed on a scrap of canvas. Image of woodblock print made by Eric Robsky Huntley.

which the nation, then the continent, then the planet, could be diagnosed for purposes of prescription. In the 1980s, specifically, the landscape architect moved and spoke amongst GIScientists, becoming influential in their discourse even as they influenced his thought. The computational globe, as an epistemic aesthetic, imbued the planet with possibility as a scale of thought and action capable of heading threatening environmental futures off at the pass.

### 3.1 GLOBE

McHarg writes at length on the arrival of the planetary in his memoir, *A Quest for Life*. He tell the reader that...

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and the Search for Unit Landscapes, 1816-1956" (Dissertation, University of Wisconsin-Madison, 2016).



The experience of seeing the entire earth, viewed from space, was like the discovery of a magic mirror. We could see ourselves whole, at last, an extended family photograph: clouds, mountains, oceans, rivers, forests, cities of people, all visible. Where were we in the picture?

...

For all of history, life has been local and parochial. Only tiny portions of the earth could be directly experienced. But looking into the night sky, we saw planets, stars, galaxies, and the moon, all coherent in black space. The silvery moon as orb and crescents revealed her wholeness. Now, in a total reverse, the earth can be viewed from space and from the moon. Today many satellites scan the face of the earth, some capable of discerning details as small as a clenched fist, so at last we can see the globe, record what we see, diagnose, and more important, regulate our behavior accordingly.

...

The view of the earth from the moon had a profound effect on me. I had gravitated in scale from local projects to metropolitan regions, river basins, and finally, the continent, but now it became apparent that I must begin to address the environment of the earth. Uncertain of what I could do, it would be enough to reserve a compartment in the mind identified with the entire earth.<sup>5</sup>

I hear in this passage the creation of an absent presence. In 1968, as images of Earthrise began to circulate, McHarg—along with many others—was led to see the planet as an

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<sup>5</sup>McHarg, *A Quest for Life: An Autobiography*, 364–65.

aesthetically coherent whole.<sup>6</sup> This inspired, yes, perhaps, a gut feeling of identification, but also the feeling that diagnosis was possible and necessary for improved treatment regimens. McHarg, who was prone to diatribes against the scabrousness of human lesions of the face of the earth, saw the planet as diseased and therefore diagnosable.

This created the imaginative conditions for a change in scalar ambition. Where regions and river basins had formed the unit landscape of his planning practice, whole-earth images established the ‘entire earth’ as an imaginable scale of action. No longer an object and scale ungraspable by technologies of representation, Earthrise and Apollo 17’s image AS17-148-22727 see 3.6 were stimuli to a project that would occupy much of McHarg’s late life: imagining institutions capable of collecting, analyzing, and synthesizing environmental data for the purposes of planetary management.

I am not alone in noticing McHarg’s adherence to a scopic regime enabled by images from orbit. Berger and Susskind point to McHarg’s work as corresponding with the birth of the ‘planetary optic’, which is now energized by climate change.<sup>7</sup> Peder Anker gives us an extended discussion of McHarg’s *Design with Nature* that places McHarg alongside Buckminster Fuller in imagining ‘spaceship earth’ as a self-regulating system.<sup>8</sup> Kathleen John-Alder presents an analysis of McHarg as exemplary of the idealism endemic to scientific quests to locate and achieve ordered knowledge.<sup>9</sup> My point here is less about McHarg and more about images of the planet as they became forms of evidence capable of emboldening

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<sup>6</sup>Denis Cosgrove, “Contested Global Visions: One-World, Whole-Earth, and the Apollo Space Photographs,” *Annals of the American Association of Geographers* 84, no. 2 (1994): 270–94, doi:10.1111/j.1467-8306.1994.tb01738.x.

<sup>7</sup>Jonah Susskind and Alan Berger, “The Planetary Optic and Finding Real Ground,” in *Design with Nature Now*, ed. Frederick R. Steiner et al. (Cambridge, MA: Lincoln Institute of Land Policy, 2019).

<sup>8</sup>Anker, *From Bauhaus to Ecohouse: A History of Ecological Design*.

<sup>9</sup>Kathleen John-Alder, *Ian McHarg and the Search for Ideal Order*, Routledge Research in Landscape and Environmental Design (New York, NY: Routledge, 2020).



*Figure 3.5: The 'whole earth', December 1972. Image by NASA, AS17-148-22727.*

movements and methodologists alike. I analyze the planetary, the global—the *globe*—as an epistemic aesthetic response to ‘ought anxiety’—the nervous sense that, even in the presence of agreed-upon world images, the mapper is left quite unable to effect change.

As Rice suggests, data collection is not only an epistemic proposition: it is also an aesthetic proposition, enacted epistemically. As argument, as rhetoric, the proliferation of information becomes its own justification; bigness begets bigness, insofar as bigness wins allies. For Rice, the ‘shaky alliance’ between epistemology and aesthetics sits here; in the space between gathering global data as evidence of a verifiable phenomenon, and in gathering just enough data, presented just so, to effect a change of mind or an increased urgency. Rice, in theorizing what she calls ‘archival magnitude’, draws on Aristotle’s concept of *megethos*, which is scale and scope, but tempered by the necessity of aesthetic coherence. For Aristotle,

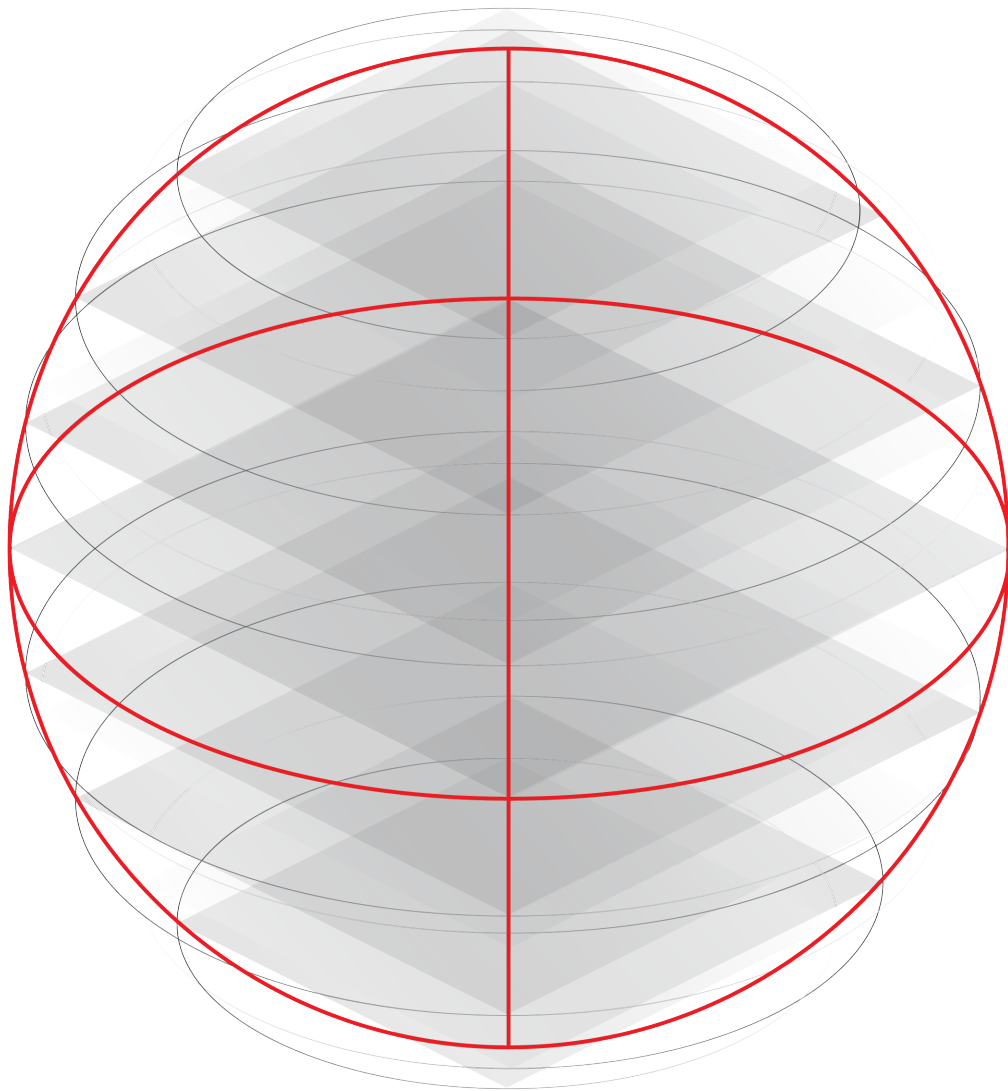
a very small animal organism cannot be beautiful; ... Nor again, can one of vast size be beautiful, as the eye cannot take it all in at once, the unity and sense of the whole is lost for the spectator; ... As, therefore, in the case of animate bodies and organisms, a certain magnitude is necessary, and a magnitude which may be easily embraced in one view.<sup>10</sup>

Epistemology has an aesthetic dimension that is central to the manner in which the magnitude of amassed information becomes acceptable as evidence. Magnitude, seen as an epistemic aesthetic, marks “a kind of coherence or a feeling of ‘taking in’ what is sometimes translated as a ‘sense of the whole.’”<sup>11</sup> Appeals to the ‘globe’ see 3.6, as a model for the ac-

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<sup>10</sup>*Poetics*, trans. Stephen Halliwell (335BC; repr., Chicago, IL: University of Chicago Press, 1998), cited in Rice, *Awful Archives: Conspiracy Theory, Rhetoric, and Acts of Evidence*, 68.

<sup>11</sup>*Ibid.*, 69.



*Figure 3.6: The globe is the horizontal extension of spatial knowledge. Graphic by Eric Robsky Huntley*

quisition of knowledge, are therefore not only epistemic. The globe does not just incite us to aspire to the scientific equivalent to world domination.<sup>12</sup> The globe incites an aspiration to coherence—an aesthetic valuation—which establishes the validity—or at least felicity—of an epistemic claim.

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<sup>12</sup>Though certainly, the history of cartography leaves little doubt that colonial expansion are tightly coupled, see Denis Cosgrove, *Apollo's Eye: A Cartographic Genealogy of the Earth in the Western Imagination* (Baltimore, MD: Johns Hopkins University Press, 2001); Peter Sloterdijk, *Globes*, trans. Wieland Hoban, *Spheres 2, Macrospherology* (Los Angeles, CA: Semiotext(e), 2014).

Architectural theorists and practitioners have taken to discussing the salience of global epistemic aesthetics to design practice in recent years. Questions of climate and planetary ecological collapse have engendered a new willingness to confront the planet as an operational scale and a narrative frame.<sup>13</sup> While I discuss Brenner and Schmidt’s ‘planetary urbanization’ at greater length below, I would here simply note that Brenner’s institutional home during this body of work’s gestational period was a school of design, rather than a social science department. This permitted the powerful elaboration of the planetary as a visual-epistemic aesthetic—while I don’t here equate the aesthetic with the visual, the force of the carto-graphics produced by the Urban Theory Lab make the point nicely.

Even for Latour, when he writes on political epistemology of the globe, he quotes the Scottish town planner Patrick Geddes—we should note that Geddes was the teacher of McHarg’s idol Lewis Mumford. Geddes, writing after the death of the French anarchist Geographer Elisée Reclus in 1905, writes approvingly of a Globe Reclus planned for the 1900 Parisian Universal Exposition see 3.7. Geddes says of the globe that it...

was no mere *scientific model* in its institute but the image, and shrine, and temple of the Earth-Mother, and its expositor no longer a modern professor in his chair, but an arch-Druid at sacrifice within his circle of mighty stones, an Eastern Mage, initiator to *cosmic mysteries* ... the unity of the world now the basis and symbol of the brotherhood of man upon it; sciences and art, geography and

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<sup>13</sup>James Graham et al., eds., *Climates: Architecture and the Planetary Imaginary* (New York: Lars Müller, 2016); Rania Ghosn and El Hadi Jazairy, *Geostories: Another Architecture for the Environment* (New York, NY: Actar, 2020); Hashim Sarkis, “Geo-Architecture: A Prehistory for an Emerging Aesthetic,” *Harvard Design Magazine* 37 (2014): 124–29; Hashim Sarkis, “The World According to Architecture,” ed. El Hadi Jazairy, *New Geographies* 4 (2011): 104–8; David Gissen, “Architecture’s Geographic Turns,” *Log* 12 (2008): 59–67, <http://www.anycorp.com/log/12>.

labour, uniting into a reign of peace and goodwill.<sup>14</sup>

The earth was no longer, then, simply an academic exercise but rather the ground for a radical political project. Brooke Belisle has also recently offered a reading of Reclus's georama in which the act of beholding an earth made immense-but-viewable was a procedure that anticipated the observed effects of seeing the earth from space.<sup>15</sup> Unity, perceived and perceivable, was meant to place the subject within a unified whole, a cosmic mystery, but also a grounded politics. The globe, as a form of evidence, as epistemic aesthetic, rhetorically wielded its own magnitude to create a sense of its totality, its mystery, and its urgency.

### 3.2 THE DENIGRATION OF THE GLOBE IN TWENTIETH-CENTURY CRITICAL THOUGHT

Such generous evaluations of properly geo-politics have become rather uncommon in geographic thought. Geography's relationship to images of the globe and the planetary are strongly suggestive of how the evaluation of forms of evidence can shift and move along aesthetic lines. Since at least the 1990s, there has been a general hostility toward the planetary view among critical geographers, a hard-won position following years of internecine conflict. Much like the post-structural tradition's distrust of vision (and often argued along similar lines),<sup>16</sup> we can trace much of this to a deep distrust of the scopic regime implied and enabled by the planetary imagination. What Haraway famously called the 'view from nowhere' is understood to imply a masculinized, phallogentric gaze whose operative verbs

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<sup>14</sup>Patrick Geddes, "A Great Geographer: Elisée Reclus," *Scottish Geographical Magazine* 21, no. 10 (October 1905): 550, doi:10.1080/00369220508733608; The obituary is in two parts, including Patrick Geddes, "A Great Geographer: Elisée Reclus, 1830–1905," *Scottish Geographical Magazine* 21, no. 9 (September 1905): 490–96, doi:10.1080/00369220508733599.

<sup>15</sup>Brooke Belisle, "Nature at a Glance: Immersive Maps from Panoramic to Digital," *Early Popular Visual Culture* 13, no. 4 (2015): 313–35, doi:10.1080/17460654.2015.1111590.

<sup>16</sup>Martin Jay, *Downcast Eyes: The Denigration of Vision in Twentieth-Century French Thought* (Berkeley, CA: University of California Press, 1994).

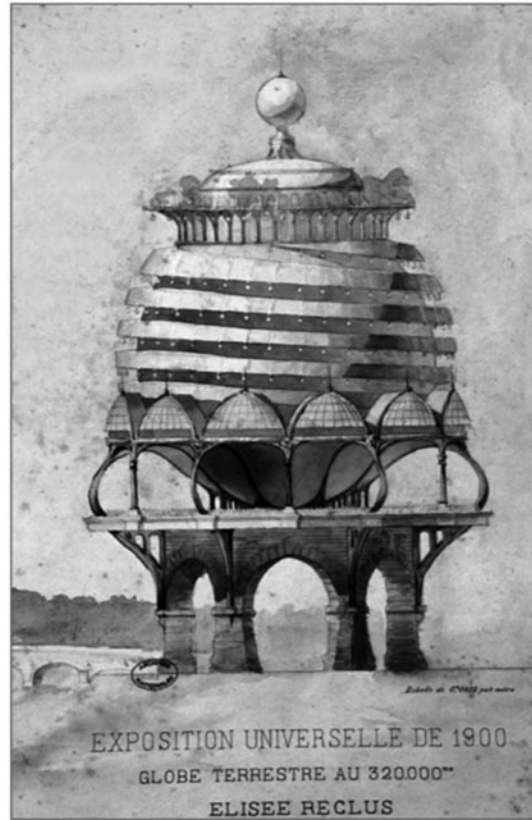


Figure 3.7: Reclus's planned 'Georama' for the 1900 Universal Exposition in Paris. Reproduction: Belisle, "Nature at a Glance," *Early Popular Visual Culture*, 2015. Original: French National Archives.

are 'to penetrate' and 'to conquer.'<sup>17</sup> Indeed, one cannot speak of the planet without raising the spectre of Haraway's god trick, named in this famously vivid passage:

The eye of any ordinary primate like us can be endlessly enhanced by sonography systems, magnetic resonance imaging, artificial intelligence-linked graphic manipulation systems, scanning electron microscopes, computed tomography scanners, color-enhancement techniques, satellite surveillance systems, home and office video display terminals, cameras for every purpose from filming the

<sup>17</sup>Donna J. Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," *Feminist Studies* 14, no. 3 (1988): 575–99, doi:10.2307/3178066; Luce Irigaray, *Speculum of the Other Woman*, trans. Gillian C. Gill (Ithaca, NY: Cornell University Press, 1985); Gillian Rose, *Feminism and Geography: The Limits of Geographical Knowledge* (Minneapolis, MN: University of Minnesota Press, 1993); Gillian Rose, "Distance, Surface, Elsewhere: A Feminist Critique of the Space of Phallogocentric Self/Knowledge," *Environment and Planning D: Society and Space* 13, no. 6 (1995): 761–81, doi:10.1068/d130761.



mucous membrane lining the gut cavity of a marine worm living in the vent gases on a fault between continental plates to mapping a planetary hemisphere elsewhere in the solar system. Vision in this technological feast becomes unregulated gluttony; all seems not just mythically about the god trick of seeing everything from nowhere, but to have put the myth into ordinary practice. And like the god trick, this eye fucks the world to make techno-monsters.<sup>18</sup>

While critical geographers have come to greatly treasure sneering invocations of the ‘god trick’, we forget that it was put forth in an essay whose aim was to make a positive argument for the necessary role of *placed* vision in feminist epistemology. The work is far more complex than citations to it would suggest. It is too frequently invoked to dismiss techniques of visualization themselves as *inherently* masculinist. Critics retain the polemic and discard the proposition: Haraway defends a certain kind of visual objectivity, even going so far as to argue that it is necessary for the articulation of feminist claims. In her words, “the further I get in describing the radical social constructionist program and a particular version of postmodernism, coupled with the acid tools of critical discourse in the human sciences, the more nervous I get.”<sup>19</sup>

Indeed, the most acute problem with the planetary vision enabled by spaceflight and sensors is not that it enables a view from nowhere; it is precisely the somewhere and the someone from whose perspective the view is constructed. As Edwards tells us, the U.S.

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<sup>18</sup>Haraway, “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective,” 581.

<sup>19</sup>Ibid., 577; Rereading this piece I was frustrated that I spent so much time in recent years reading and rereading Latour’s post-critical scholarship with drool falling from the side of my mouth. E.g., Bruno Latour, “Why Has Critique Run Out of Steam? From Matters of Fact to Matters of Concern,” *Critical Inquiry* 30, no. 2 (2004): 225–48, doi:10.1086/421123.



Figure 3.8: *The Farnese Atlas in Naples whose stance prevents him from seeing his object. Photo by Roberto De Martino, released to the public domain.*

war machine built the closed world of planetary computation and continues to discursively structure its vision.<sup>20</sup> It is well-established that representations of the whole earth were essential to the maintenance of American hegemony and its neo-colonial aspirations in the post-War period, even as aspirations to circle the globe had earlier spurred colonialism's expropriative adventure.<sup>21</sup>

What unites all of these critiques is a marked distrust of precisely the planetary optic's universalizing *aesthetic* that naturalizes and homogenizes spatial relations. As Doreen Massey might say, representing the earth as a closed system forecloses an alternative telling

<sup>20</sup>Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America*.

<sup>21</sup>Cosgrove, "Contested Global Visions: One-World, Whole-Earth, and the Apollo Space Photographs"; Cosgrove, *Apollo's Eye: A Cartographic Genealogy of the Earth in the Western Imagination*; Sloterdijk, *Globes*.

of planetary relations open to the “simultaneity of stories-so-far.”<sup>22</sup> And yet, the planetary gaze implies its own limits. Jennifer Light notes the immense irony of the fact that even as the association of photographic imagery with unmediated truth ensured the uptake of aerial views by the military, the immense difficulties posed by the interpretation of those images led to the emergence of a whole new geographic subfield: aerial photo interpretation.<sup>23</sup> Jeanne Haffner tells a convincing tale in which progressive forms of urban planning were spurred by the aerial view.<sup>24</sup> Peter Sloterdijk notes that if we examine one of the classical figures of planetary knowledge—Atlas carrying the globe, fig. 3.8—we find a hunched figure bowed under his charge, unable to visually inspect even part of his burden.<sup>25</sup> Vision—real, non-illusory, embodied—can work to debunk myths of flight and mastery. If Atlas’s eyes are in his body, we must acknowledge that he can see very little with his head bent over.

And, indeed, despite the storied hostility of geographers to the disembodied unity of the planetary gaze, there are signs that the planetary may be reemerging as a scale for thought and action on the left. Brenner and Schmidt, for example, have put forward ‘planetary urbanization’ as a new epistemology for urban studies that emphasizes the.<sup>26</sup> This move has not gone uncontested; it has been subject to vigorous critique from feminist, post-colonial,

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<sup>22</sup>Massey, *For Space*, 9.

<sup>23</sup>Jennifer S. Light, *From Warfare to Welfare: Defense Intellectuals and Urban Problems in Cold War America* (Baltimore, MD: Johns Hopkins University Press, 2003).

<sup>24</sup>Jeanne Haffner, *The View from Above: The Science of Social Space* (Cambridge, MA: The MIT Press, 2013).

<sup>25</sup>Sloterdijk, *Globes*; In citing Sloterdijk, I must note my own discomfort, as his affinity for the new German nativism becomes clearer; the parallels between his thought and that of his model Heidegger have become disturbingly less theoretical in the last several years, as documented by Thomas Meaney, “A Celebrity Philosopher Explains the Populist Insurgency,” *The New Yorker*, February 26, 2018, <https://www.newyorker.com/magazine/2018/02/26/a-celebrity-philosopher-explains-the-populist-insurgency>.

<sup>26</sup>Neil Brenner, “Theses on Urbanization,” *Public Culture* 25, no. 1 (2013): 85–114; Neil Brenner, ed., *Implosions/Explosions: Towards a Study of Planetary Urbanization* (Berlin: Jovis, 2014); Neil Brenner and Christian Schmid, “Towards a New Epistemology of the Urban?” *City* 19, nos. 2-3 (2015): 151–82; Neil Brenner, “Debating Planetary Urbanization: For an Engaged Pluralism,” *Environment and Planning D: Society and Space* 36, no. 3 (2018): 570–90, doi:10.1177/0263775818757510.

and critical race scholars.<sup>27</sup> Even conventional urban theorists have been unamused.<sup>28</sup> Debate persists and rages (quietly) on, despite the best efforts of the planetary urbanists to respond generously.<sup>29</sup> The critique of the planetary gaze has worn deep grooves in our muscle memory.

However, Brenner and Schmidt are far from the only critical scholars reevaluating their relationship to certain forms of planetary totality. Gayatri Spivak, for example, identifies the necessity of what she calls ‘planetarity,’ as opposed to the ‘global.’ For Spivak, the ‘global’ is the discursive practice through which the planet is saved by “good policy” that keeps “geology safe for good imperialism.”<sup>30</sup> Planetary human beings, for Spivak, are not the jet-setting subjects of global capital, but radically earthbound actors aware of their position amongst innumerable others.

The globe is on our computers. No one lives there. The ‘global’ notion allows us to think that we can aim to control globality. The planet is in the species of

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<sup>27</sup>Natalie Oswin, “Planetary Urbanization: A View from Outside,” *Environment and Planning D: Society and Space* 36, no. 3 (2018): 540–46, doi:10.1177/0263775816675963; Natalie Oswin, “Society and Space, Here and Now,” *Environment and Planning D: Society and Space* 36, no. 4 (2018): 613–16, doi:10.1177/0263775818790806; Kate Derickson, “Masters of the Universe,” *Environment and Planning D: Society and Space* 36, no. 3 (2018): 556–62, doi:10.1177/0263775817715724; Azam Khatam and Oded Haas, “Interrupting Planetary Urbanization: A View from Middle Eastern Cities,” *Environment and Planning D: Society and Space* 36, no. 3 (2018): 439–55, doi:10.1177/0263775818759334; Heather McLean, “In Praise of Chaotic Research Pathways: A Feminist Response to Planetary Urbanization,” *Environment and Planning D: Society and Space* 36, no. 3 (2018): 547–55, doi:10.1177/0263775817713751; peake\_placing\_2018; Geraldine Pratt, “One Hand Clapping: Notes Towards a Methodology for Debating Planetary Urbanization,” *Environment and Planning D: Society and Space* 36, no. 3 (2018): 563–69, doi:10.1177/0263775817716555; Rajyashree N Reddy, “The Urban Under Erasure: Towards a Postcolonial Critique of Planetary Urbanization,” *Environment and Planning D: Society and Space* 36, no. 3 (2018): 529–39, doi:10.1177/0263775817744220.

<sup>28</sup>Richard Walker, “Building a Better Theory of the Urban: A Response to ‘Towards a New Epistemology of the Urban?’” *City* 19, nos. 2-3 (2015): 183–91, doi:10.1080/13604813.2015.1024073.

<sup>29</sup>For Brenner and Schmidt’s response to e.g., Oswin, Derickson, and Reddy, see Brenner, “Debating Planetary Urbanization: For an Engaged Pluralism”; responses to Walker’s critiques are in an unpublished working paper, Neil Brenner and Christian Schmid, “Combat, Caricature & Critique in the Study of Planetary Urbanization” (Urban Theory Lab, 2015).

<sup>30</sup>Gayatri Chakravorty Spivak, “Planetarity,” *Paragraph* 38, no. 2 (2015): 290–92, doi:10.3366/para.2015.0166.

alterity, belonging to another system; and yet we inhabit it, on loan. It is not really amenable to a neat contrast with the globe. I cannot say ‘the planet, on the other hand.’<sup>31</sup>

For Spivak, the planet is that to which we are subject, an alterity within which we are always-already standing, sitting, just getting along.

Stengers and Latour, as well, are seeking new operative metaphors for the planetary in a reimagined Gaia theory. Where Gaia originated as a scientific theory describing the radical ecological interrelatedness of all earth’s critters, theorists now mine this image for new on-ramps to earthly thought<sup>32</sup>. For Stengers, a de-scientized Gaia forces a reimagination of the earth that is bristling and indifferent; a ticklish creature that is beginning to reassert herself.<sup>33</sup> Latour builds on this project to imagine a new polity that comes ‘down to earth’, which is to say that the earth arrives as a political actor among truly planetary publics: which is to say publics that are alive amidst (and not above) different modes of life.<sup>34</sup>

I gloss this emerging orientation too quickly; this is certain. This is perhaps because I don’t mine it for arguments, but for orientations. Relationships to the globe as a mode of aesthetic coherence are in flux, always in flux. To present as ‘whole’ in the manner enabled by the planetary imagination is persuasive rhetoric only when it meets its public on acceptable aesthetic grounds. Such a pragmatic reading of the aesthetics of magnitude recognizes

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<sup>31</sup>Ibid., 201.

<sup>32</sup>For recent appraisals of the theory by its originators, see James Lovelock, *The Revenge of Gaia: Earth’s Climate Crisis and the Fate of Humanity* (New York, NY: Basic Books, 2007); Lynn Margulis, *Symbiotic Planet: A New Look at Evolution* (New York, NY: Basic Books, 2008).

<sup>33</sup>Isabelle Stengers, *In Catastrophic Times: Resisting the Coming Barbarism* (Paris, FR: Open Humanities Press, 2015).

<sup>34</sup>Bruno Latour, *Down to Earth: Politics in the New Climatic Regime* (Medford, MA: Polity, 2018); see also Bruno Latour, *Facing Gaia: Eight Lectures on the New Climatic Regime*, trans. Catherine Porter (Medford, MA: Polity, 2017).

that rhetoric can persuade... or not. Representations can convince... or not. Maps can precede the territory... or not, all based on their correspondence with aesthetic regimes of acceptability. Such faltering challenges the stories we tell ourselves about the crisis of representation in geography and elsewhere, where the anxieties associated with representational practice have been understood epistemologically, not aesthetically.

In what remains of this chapter, I will speak of the manner in which McHarg's thought became global, computationally. Shortly after his most well-known period of work (approximately 1963-1969), he became a proselyte for GIS technologies and their use in the conduct of ecological inventories at ever-increasing scales. I argue that geocomputation and global forms of evidence were co-constitutive in McHarg's practice; as storage media and computational power became more available for the production of computational globality, the globe became graspable. To say 'graspable' is not simply to say 'knowable.' Grasping the globe is an act of knowability, evaluated aesthetically. The globe became coherent as a scale for thought and action alongside the arrival of geocomputation.

### 3.3 WONDERFUL PROSTHESES

Above, I quote a passage in McHarg's memoir which establishes the relationship between the visibility of the planet and the scalar ambition of his practice. However, contact with the planet, visible from space, did not leave as feeling of mastery as residue. Rather, it nurtured uncertainty. "Uncertain of what I could do," McHarg says, "it would be enough to reserve a compartment in the mind identified with the whole Earth."<sup>35</sup> Such a compartment, attached to an image of an ecological whole earth made calculable at-scale, required technological de-

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<sup>35</sup>McHarg, *A Quest for Life: An Autobiography*, 365.

velopment. “Large-scale ecological inventories ha[ve] always been dependent on computer capability.”<sup>36</sup>

The ability to populate the compartment was tied to techniques for brain-augmentation; for McHarg, the computer was a prosthetic device for the brain. On the occasion of receiving the President’s Award from Esri in 1997, McHarg is optimistic, informing the GIScientists in the room of their cyborg capacities. “[T]he capability of environmental science, the capabilities of sensors, of satellites, of computers, and not least of GIS, means that we have developed new and wonderful *prostheses*.”<sup>37</sup> By the time of this speech in the late 1990s, McHarg had been working out his theory of the prosthetic brain in many venues over the past several decades. At GIS conferences, to which he was invited to give keynotes; in reports to the EPA, completed as an often over-stepping consultant; in attempts to galvanize military-industrial actors and environmentalists to pursue, together, the project of planetary geocomputation. For McHarg, the history of technological change was the history of medially augmented human power. The spear, the musket, the rifle, and the hydrogen bomb enhanced the muscle. The telescope and the microscope rescaled what the eye could grasp. Microphones, radios, telephones, and satellites gave aid to our tongues. At long last, computation was set to augment the brutish brains that had driven landscape despoilation, rendering them able to analyze the evidence at previously unimaginable scales. The globe, as a form of evidence, as an epistemic aesthetic, was made possible by new ways of seeing and storing spatial information.

If the previous chapter was concerned with the ‘layer’ as an epistemic aesthetic, we turn

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<sup>36</sup>Ibid., 366.

<sup>37</sup>*Ian McHarg at the 1997 ESRI User Conference, Part 1 - YouTube*, n.p.

here to the ‘globe,’ with a specific focus on the relationships between computation, futurity, and the planetary imagination. I ask: how does not-knowing-enough drive the imagination outward to imagine a the completion of cartographic coverage? Computational means of representing the future cartographically became increasingly key to McHarg’s thinking of the earth, with the planet emerging as an operative scale alongside the arrival of increasing computational capacity. I am indebted to Garrett Dash Nelson, who traced the emergence of progressively larger ‘unit areas’ in in the planner’s imagination over the course of the 20th century. Nelson is concerned with what happens when planners confront the conventional territories of political geography and find them untenable.<sup>38</sup> I am concerned with the technical means by which the globe became a viable in the aesthetics of design epistemology: through computation and, specifically, GIS.

#### 3.4 THE BRAIN AWAITS ASSEMBLY

We can see the first murmurs of McHarg’s aspirational upscaling in a plan completed for the Environmental Protection Agency (EPA) by McHarg’s first and best-known firm, Wallace, McHarg, Roberts, and Todd (WMRT). The firm was hired as a subcontractor to the American Institute of Planners to write a *Comprehensive Plan for National Environmental Quality*<sup>39</sup>. This plan rescaled McHarg’s vision of vertical holism, forcing a reckoning with the planetary horizontal extent of salient environments. It was along these lines that McHarg would make his case most visibly to GIS practitioners over the course of the 1970s and 80s.

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<sup>38</sup>Nelson, “A Place All Together: Planning and the Search for Unit Landscapes, 1816-1956”; Garrett Dash Nelson and Alasdair Rae, “An Economic Geography of the United States: From Commutes to Megaregions,” *PLoS ONE* 11, no. 11 (2016), doi:10.1371/journal.pone.0166083.

<sup>39</sup>Ian L. McHarg, “Towards a Comprehensive Plan for Environmental Quality” (Philadelphia, PA: Wallace McHarg Roberts and Todd, December 16, 1973), 109.V.D.3.24, *Towards a Comprehensive Plan for Environmental Quality* (1973), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.



This first plan for the EPA came about thanks, in part, to McHarg's close ties to the milieu foregrounded in the last chapter: the environmental establishment that emerged from the rapid institutionalization of United States environmentalism in the 1960s-70s. William K. Reilly, the first director of the EPA, was past president of the Conservation Foundation and counted McHarg on a *very* short list of influential (if non-advisory) figures in a 1992 oral history.

There certainly wasn't anybody on the outside that I regularly looked to for environmental guidance. There were people I had known in the scientific area such as Starker Leopold, a zoologist at the University of California at Berkeley and the son of Aldo Leopold. I probably had more contact with him when I was at the Interior Department than after I went to EPA. Stanley Cain, a professor at the University of Michigan and Assistant Secretary of the Interior, was another source. I mentioned Keith Caldwell earlier. Ian McHarg, a landscape architect at the University of Pennsylvania, was another one. There were many contacts of this sort, but I certainly wouldn't think of them as mentors. That sounds a little self-important, but the fact is, in the early days, EPA was pretty much out front in environmental affairs. It was unlike the situation today, where there is a wide body of people with experience and wisdom in the environmental area. In those days, I won't say CEQ [Council on Environmental Quality] and EPA stood alone; but we were definitely out front.<sup>40</sup>

Cain, McHarg, and the Leopolds were products of and produced the expertise-oriented

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<sup>40</sup>Russell E. Train, interview by Michael Gorn, July 1993, <https://archive.epa.gov/epa/aboutepa/russell-e-train-oral-history-interview.html>, n.p.

environmental regime that appeared in the previous chapter. The sphere of influence around the first director of the EPA was limited to the ad hoc group of scientific professionals nurtured by the Conservation Foundation over the course of the 1960s. The form of knowledge this collective envisioned—which I’ve described as the ‘layer’—became a guiding principle for federal actors eager to quell the surge of environmental activism among New Left activists.<sup>41</sup> For at least this reason, McHarg became an influential figure, sought out for his environmental expertise and interest in plannerly applications of environmental knowledge.

The plan WMRT submitted to the EPA began unconventionally. This was true even by the standards of the time, which had not yet seen government reporting so fully overwhelmed by bureaucrat-speak. It begins by articulating a theory of cyborgic enhancement:

Lord Acton once said ‘Power corrupts, absolute power corrupts absolutely.’ He addressed his admonition to the political process, where it still holds true; it is as applicable to the environment. As power increases, so does the capacity to create and destroy. George Wald, biologist and Nobel Laureate, once mused on this matter. He observed that the extinction of the dominant dinosaurs might well relate to the enormous enlargement of body and power without a commensurate increase in brain size. But take a man; the power of muscle alone is no threat to the environment. Give him a fleet of bulldozers, pesticides, high explosives, a bomber, an atomic bomb. His power is infinitely multiplied but not his brain. He is now another type of dinosaur. The burden of this study is the

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<sup>41</sup>See Barker, “The Liberal Foundations of Environmentalism: Revisiting the Rockefeller-Ford Connection”; Fisher, “The Role of Philanthropic Foundations in the Reproduction and Production of Hegemony: Rockefeller Foundations and the Social Sciences”; Peter L. Laurence, “Urban Design and the New Environmentalists: The Legacy of the Rockefeller Foundation’s Urban Design Research Initiatives” 2008; Gioielli, “Foundations and American Environmentalism After World War Two.”

suggestion that the power of technological man is massive; his effects upon the environment have been predominantly deleterious. The time has come to enlarge the brain that controls the power. The brain indeed exists; it awaits assembly. It includes all of our magnificent prostheses—satellites, computers, digital scanners, and the totality of scientific knowledge. The men and machines lie in wait, capable of resolving the problem of managing the environment, enhancing the quality of health and wellbeing of the people of this nation and its children yet unborn. It is now the time first to resolve and then to realize.<sup>42</sup>

Thus, this plan for environmental quality began with a far more abstract diagnostic. Scientific practice had segmented and overspecialized the scientific subject. This segmentation had degraded the carrying capacity of their brains, those poor organs tasked with carrying the weight of reason. It was only through ecological approaches that the scientist and their institutions could repair the brain. This is the epistemic move I have described in the previous chapter as ‘layering.’ To heal the earth was a matter of cognitive repair, readhering the scattered components of the atomized (and atomic-aged) brain. The argument continued that the brain, even reassembled, needed further enhancement that was afforded by computation, satellites, and the whole technological apparatus of the military-industrial-academic complex.<sup>43</sup> McHarg’s theory of prosthetics, targeted cranially, is inherited partially from Lewis Mumford, whose *Myth of the Machine* series (and the preceding *Tech-nics and Civilization*) argued along similarly ambivalent lines—not exactly technophillic,

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<sup>42</sup>McHarg, “Towards a Comprehensive Plan for Environmental Quality,” 2.

<sup>43</sup>Stuart W. Leslie, *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford* (New York: Columbia University Press, 1993).

not exactly technophobic.<sup>44</sup> The institutional form of this prosthetic would itself be distributed horizontally in space, requiring experimentation with networked forms of research and collaboration. The plan envisioned a new institution, a National Environmental Laboratory comprising 34 regional environmental labs corresponding to the physiographic regions identified by Johns Hopkins geologist Charles Hunt's "The Physiographic Regions of the United States."<sup>45</sup> Each of these labs would be responsible for organizing the continuous monitoring and modeling of their surrounds, and engineering a concomitant reorganization of democratic processes along proto-informatic lines.

However, computation was product and productive of a paradox. Under military advisement,

high technology satellites with multiple cameras and sensing devices monitor each part of the United States every eighteen days while substantial parts of the country have not yet been mapped. ... The technology exists to undertake a national ecological survey as a continuing process, utilizing remotely sensed imagery, ground data, existing mapped and published data to provide a basis for ecological planning.<sup>46</sup>

Computation, as a prosthetic, was amplifying destructive power through such military entanglements, an aim quite different than the extension of the brain. Such a prosthetic

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<sup>44</sup>*Technics and Civilization; Technics and Human Development; Pentagon of Power*; Incidentally, it is this vision of technics with which Winner begins his classic "Do Artefacts Have Politics?", "Do Artifacts Have Politics?" *Daedalus* 109, no. 1 (1980): 121–36, doi:10.4324/9781315259697.

<sup>45</sup>Charles B. Hunt, *Physiography of the United States* (San Francisco, CA: W. H. Freeman, 1967); Fred Rasmussen, "C. B. Hunt, 91, Hopkins Professor, Geologist," *The Baltimore Sun*, September 18, 1997; Allen W. Hatheway, "Biography of Charles Butler Hunt, Geologist," *Bulletin of the Association of Engineering Geologists* 30, no. 2 (1993): 139–55.

<sup>46</sup>McHarg, "Towards a Comprehensive Plan for Environmental Quality," 26.

apparatus was understood to extend the promise of liberal democratic institutions in several ways.

First, networked data access would permit public libraries to make terminals available through which interested constituents could ask questions of the earth. For example, the responsabilized environmental subject envisioned by this proposal could ask where specific viewshed conditions exist within a half-a-mile of a major employment center—the participant in ecological democracy was thus envisioned as responsible for locating landscapes of intrinsic fit using the affordances of data made visible at television terminals at the Public Library. Liberal democracy as suitability analysis!

Secondly, beyond the choice model of site location outlined above, McHarg imagined democracy flowing forth from distributed data access. In addition to displaying cartographic solutions to questions asked by the public, the library terminals might function to solicit input based on values and preferences. A prospective map—a plan—might be subject to greater public scrutiny or at least made subject to the stated values of individuals. Where the computation of scenarios had been a complicated manual-cartographic process in McHarg's earlier practice, computers could potentially generate different scenarios based on different combinations of factors with different weight almost instantaneously.

Thirdly, computation was understood to contain immense potential for extending the horizontal extent of the model. Digital scanners, computers, and displays would permit the rapid acquisition and digitization of data, subject to layered integration. Where previously, McHarg's practice of integration had been constrained by the unit landscapes of clients, computerized ecological planning could take as its unit landscape the North American continent or, as we'll see later, the earth. However, such a future for attaining a geocomputa-

tional globe was subject to the constrained knowledge-practices of institutionalized science. He shares a 'personal experience' at the conclusion of the report to suggest both the problem and the remedy:

In order to demonstrate how an ecological study might be performed for the Puget Sound, a list of over a hundred scientists was assembled. From this group, forty persons were selected as being the most authoritative scientists representing the sciences of the environment in the region. Many had national and international reputations. They were drawn from universities, colleges, federal, and state institutions in the region. They met. It transpired that few persons knew any other person present. Few, if any, were engaged or had been engaged in the planning process. They discussed data within their fields, prior and continuing research, and revealed in sum a great richness of understanding of the region. When it emerged that they might have the opportunity to associate in preparing an ecological study for the region a great euphoria engulfed the assembly. Here was the unusual circumstance whereby the best intelligences of the Puget Sound were assembled and willing to participate in what would have been a landmark ecological planning study. However, it transpired that no institution capable of employing them existed, no funds were available for such studies. The group dispersed. But they, and others like them in many regions continue to exist, awaiting the creation of institutions capable of employing them.<sup>47</sup>

For McHarg, geocomputation, as the layering of disciplinary knowledges, "provides a to-

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<sup>47</sup>Ibid., 120.

tal technology for the ecological planning method described.”<sup>48</sup> Computation, far from the devilish mechanism for the establishment of bureaucratic order, was a liberal-democratic instrument able to bring the sciences and their publics into the same process. For McHarg, liberal democracy was a potential beneficiary of planetary environmental monitoring, but expertise would remain distributed regionally, a kind of informational federalism. This brand of governance could predict, and therefore prevent, environmental ruination through predictive models built with environmental data at ambitious scales.

McHarg would continue to propose reorganizations of the federal environmental armature along physiographic and computational lines. He attended a 1981 workshop convened by the noted ecologists H. T. Odum and M. T. Brown under the auspices of the National Science Foundation. The assembled ecologists and planners were to discuss “Research Needs for a Basic Science of the System of Humanity and Nature and Appropriate Technology for the Future”<sup>49</sup>

McHarg placed on full display his habitual incapacity to read the room; here, we benefit from an unedited transcript found in his archive, rather than the sanitized version that was published in the proceedings.<sup>50</sup> The National Science Foundation—which, recall, had sponsored the workshop—“gives dignity and approbation to people as a function of the level of abstraction”; it bestows honors and funding upon scientists who are “concerned with atomic power particles so you can attack the gonads of the world [...] If you’re concerned

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<sup>48</sup>Ibid., 110.

<sup>49</sup>The workshop was funded by a small NSF conference grant of \$28,000 (#ISP-8014773—part of the foundation’s Appropriate Technology program.

<sup>50</sup>McHarg, “Proposal for a National Environmental Lab”; This is published as Ian L. McHarg, “Proposal for a National Environmental Lab,” in *Research Needs for a Basic Science of the System of Humanity and Nature and Appropriate Technology for the Future*, ed. Mark T. Brown and Howard T. Odum (Tallahassee, FL: University of Florida, 1981), 106–11, <https://ufdc.ufl.edu/UF00016639/00001/113j>.

with submolecular biology, molecular biology and you couldn't recognize an organism with a fucking label on it, you get great approbation, but if you're concerned with the human condition, you know that you have dirty fingernails, you speak with a very bad accent, and you certainly shouldn't get government support"<sup>51</sup>

McHarg's advocated for the same institution he argued for in the 1973 *Comprehensive Plan*: a National Environmental Laboratory comprising 34 regional environmental labs. One of for each of Charles Hunt's physiographic regions.<sup>52</sup> Each of these labs would be responsible for organizing the continuous monitoring and modeling of their surrounds, as well as "digitizing their models and storing them," though the task of carrying out data collection and research would be developed to universities. The results of these models would be available in public libraries, with computer terminals accessible to a broad public. These terminals would be the channels through which the an informed public would get its information that would guide planning processes and development decisions. "I want to find those locations where there's 20,000 acres of land at not more than \$5,000 an acre, where I can get a billion gallons of water a day and where the physiographic range should be not more than... etcetera, etcetera, etcetera. Then you collect 200 or 300 categories and then the damn thing displays."<sup>53</sup>

McHarg attempted to signal his membership in the scientific cogniscenti through the enumeration of a council that should guide the laboratory, though he deferred to the qualifications of the assembled practitioners, as he was "not a scientist, and will never be, and [was], in fact, very proud of it."<sup>54</sup> Among those scientists who should be enlisted were:

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<sup>51</sup>McHarg, "Proposal for a National Environmental Lab," n.p.

<sup>52</sup>Hunt, *Physiography of the United States*.

<sup>53</sup>McHarg, "Proposal for a National Environmental Lab," n.p.

<sup>54</sup>*Ibid.*, n.p.



George Wald, the Harvard Nobel Prize winner whose address ‘Generation in Search of a Future’, delivered in MIT’s Kresge Auditorium as part of a 1969 teach-in, has become a key text in the history of United States anti-war activism and rhetoric; the fluvial geomorphologist and water management reformer Luna Leopold whose father, Aldo Leopold, had been on the Advisory Board of The Conservation Foundation and who worked to “connect groundwater science to contemporary societal concerns”; Paul Ehrlich, the neo-Malthusian whose *The Population Bomb* spurred the overpopulation debates of the 1970s; the psychiatric epidemiologist Alexander Leighton whose work with his wife, Jan Murphy, associated mental health with human environment; Paul Sears, the zoologist, conservationist, and first chair of a short-lived Yale program in Conservation (1950-1959) funded by the Conservation Foundation; and Howard T. Odum, the ecologist, systems theorist, and workshop organizer who developed durable theories of self-organization.<sup>55</sup> Such a council, guiding a laboratory, would go far towards the making-prosthetic of the human brain—“this organ at the end of the spine, which may very well be the apex of biological evolution or [...] a spinal tumor” in order to “plan alternative futures, really dream for some all-but-unfulfillable future, or many of these.”<sup>56</sup>

A highly constrained knowledge politics indeed, but one that holds that threatening futures—ecological and otherwise—require expanded unit landscapes, enabled by data storage, access, and display capabilities of nascent geocomputation. The technical means through

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<sup>55</sup>Wald, “A Generation in Search of a Future”; Randall J. Hunt and Curt Meine, “Luna B. Leopold-Pioneer Setting the Stage for Modern Hydrology,” *Groundwater* 50, no. 6 (2012): 966–70, doi:10.1111/j.1745-6584.2012.00994.x; Paul Ehrlich, *The Population Bomb* (New York, NY: Ballantine Books, 1968); Marc Adélar Tremblay, *Alexander H. Leighton’s and Jane Murphy’s Scientific Contributions in Psychiatric Epidemiology: A Personal Appreciation*, *Classiques Des Sciences Sociales* (Chicoutimi: J.-M. Tremblay, 2006), doi:10.1522/cla.trm.ale2; Judith Schiff, “The First Graduate Program for the Greens,” *Yale Alumni Magazine*, June 2017, <https://yalealumnmagazine.com/articles/4478-paul-b-sears>; Lance Gunderson et al., “In Memory of Mavericks,” *Conservation Ecology* 6, no. 2 (2002): 19, doi:10.5751/ES-00423-060219.

<sup>56</sup>McHarg, “Proposal for a National Environmental Lab,” n.p.

which spatial analysis was to be scaled up—nationally, supernationally, globally—would become the fixation that most occupied McHarg’s late life. This coincided with his taking an increasingly visible position among GIS practitioners, in three key ways. First, he became partner in a new firm called Expert Information Systems (EIS) which proposed many digital inventories for state governments—even if the state contracts awarded were few—and under whose auspices McHarg operated for much of the 1980s. Second, as a figurehead who began to solicit the interest of spatial analysis practitioners directly as a keynote speaker at a number of GIS conferences throughout the 1980s. Third, as a pedagogue increasingly convinced that ecological planning practice must be computerized. I will turn first to efforts to computerize ecological planning for purposes of pedagogy.

### 3.5 COMPUTERIZING ECOLOGICAL PLANNING

At the conclusion of the previous chapter, I indicated how computation in teaching had proven disastrous for McHarg’s department in the 1970s. Studios seeking to implement computerized ecological planning drove students away from the program in landscape architecture and regional planning in droves. By the mid-1980s though, computation once again appeared viable. The Graduate School of Fine Arts (GSFA) made a heavily capitalized foray into computation in 1984 when it procured an Integraph 11-751 CPU, along with three work stations at a cost of \$500,000. Outside pressure from industry did a great deal to drive this acquisition, as large architecture firms were beginning to adopt computers as drawing aids. The GSFA bought a Vax system—instead of the IBM system also under consideration—due to a large gift of bespoke software developed internally by architectural megafirm Skidmore, Owings, and Merrill (SOM). Bruce Graham, a partner at SOM and chair of the GSFA

Board of Overseers, offered the department a collection of bespoke technical and engineering programs which bounded the department's decision as to which hardware it might adopt.<sup>57</sup>

When the Intergraph arrived in 1984, it was the source of a great deal of optimism. McHarg writes in a letter to the Landscape Architecture and Regional Planning Faculty that in “there is reason to believe that the forthcoming year will be a landmark. It would appear that we will enter the computer world with an impressive capability.”<sup>58</sup> The hardware acquisition did not represent a basic reconfiguration of practice, but rather a streamlining of existing methods. “Everything which we have heretofore done, either with handcrafted maps, or with photosensitive mylar, can be done faster, better, and cheaper by Intergraph.”<sup>59</sup>

So what had they heretofore done? Beginning in 1981, the GSFA had adopted Chrometex equipment which allowed students to map site data with acetate overlays (see fig. 3.9). This was an enormous improvement on the previous method—“previously, site analyses were carried out using color markers on opaque print paper”. However, it still required that students cut out sepia masters on which further iterations could be made, a rather painstaking manual exercise. Nonetheless, photo-sensitive Chrometex was the source of a great deal of excitement when it arrived, for reasons of both texture and exactitude. Data layers could be printed with variations “in color, texture, and value.” Map-makers could then overlay those sheets “to accumulate opportunities, constraints, and finally suitability syntheses” with “greater exactitude and explicitude.”<sup>60</sup> Such development was consistent with previous developments in the Penn department; mylar replaced paper, acrylic paint replaced magic

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<sup>57</sup>Ian L. McHarg, “Memo to Landscape Architecture and Regional Planning Faculty,” 1984, 109 I.E.1.113, Intermural Memos, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA; Ann Leopold, “The GSFA Enters the Computer Age,” *Penn in Ink* Spring (1983): 21–22.

<sup>58</sup>McHarg, “Memo to Landscape Architecture and Regional Planning Faculty,” n.p.

<sup>59</sup>Ibid., n.p.

<sup>60</sup>McHarg, interview, n.p.

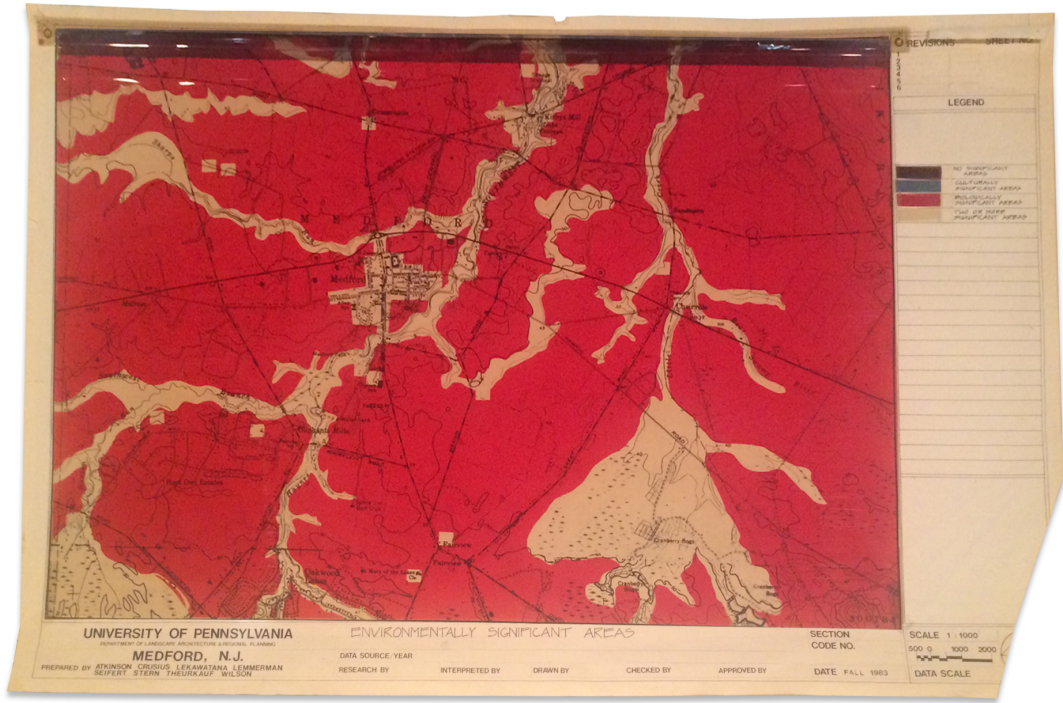


Figure 3.9: Maps of the Medford site in 1983, produced using Chrometex. Image: Eric Robsky Huntley. Original: Architectural Archives, University of Pennsylvania.

markers. Studio leaders went to great lengths to develop methods for the quantitative use of color. The introduction of computation would allow for the storage, rapid retrieval, and reproducible combination of data layers; McHarg was relatively slower to understand or appreciate how computation might fundamentally extend or reconfigure practice or analysis.

Some within the department were pushing for broader applications. Jon Berger, for example, was frustrated by existing approaches to cartography: “while we invoke the concepts of ecology, we are limited by our tools of static maps, and lifeless crosssections.”<sup>61</sup> His proposal was technological: provide a ‘revolutionary’ predictive software tool for policy makers. His vision was a kind of temporally enriched cartography, ‘maps that move’ to somewhat literally adopt Wilson’s parlance: “I see a data system with its separate parts arranged spatially but connected as they are ecologically such that human intervention over time can be mapped, the inputs graphed and also mapped.”<sup>62</sup>

Following the arrival of the Intergraph system, McHarg began to search for a ‘geographer-computer scientist’ to implement his computational vision, soliciting recommendations from prominent geographers, including David Simonette, Waldo Tobler, Michael Goodchild, and Bill Warntz. With the exception of Warntz and the much younger Goodchild, these are the same names that supported the hiring of MacDougall in 1969. Goodchild in particular supported John Radke, a recent PhD from the University of British Columbia as a candidate for the position. Radke had already decided to leave his first teaching position at Wilfred Laurier University in Waterloo to take a job with a multinational corporation to consult on

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<sup>61</sup>Jon Berger, “Ecological Land Use Planning at the University of Pennsylvania: State of the Art and Threshold,” in *Research Needs for a Basic Science of the System of Humanity and Nature and Appropriate Technology for the Future*, ed. Mark T. Brown and Howard T. Odum (Tallahassee, FL: University of Florida, 1981), 44, <https://ufdc.ufl.edu/UF00016639/00001/113j>.

<sup>62</sup>Ibid., 44; Wilson, *New Lines: Critical GIS and the Trouble of the Map*.

the buildout of computer infrastructure. However, McHarg convinced him to delay his start date for the length of the fall semester; he came to Penn for four months to develop suitability analysis applications for the department's Intergraph and to computerize the department's pedagogy.<sup>63</sup>

Radke's first task when he arrived in the department was to build on and complete an extant department initiative to digitize site data, in collaboration with researchers in the Penn hospital. Before Radke's arrival, a hired consultant and lecturer named Jorge Sanchez Flores had begun to work with a radiologist who had some experience digitizing X-rays.<sup>64</sup> Using a rather primitive armature consisting of a Nikon TV camera linked to a data processor and a Vax 11-780,<sup>65</sup> Radke and a hospital research assistant digitized 400 screentone sheets containing site data for Medford, NJ, a the recurring site of LARP's introductory studio. Radke, at the same time, demonstrated that aerial photography could be digitized, though there as of yet no method to incorporate digitized aerial imagery into suitability analysis. Based on the success of this experiment, computerized ecological planning became a part of the introductory studio curriculum in Fall 1984.<sup>66</sup>

Despite the arrival of digital methods, analog muscle memories persisted. According to John Radke, McHarg's patterns of thought, learned from years of conducting analog suitability with magic marker or Chrometex, inhibited his migration into computational modes of work:

He was still trying to make the computer act like a drawing board. He was trying

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<sup>63</sup>McHarg, "Memo to Landscape Architecture and Regional Planning Faculty"; John Radke, interview by Eric Robsky Huntley, March 31, 2016.

<sup>64</sup>"GSFA News: Going Digital," *Penn in Ink* Spring (1984): 22.

<sup>65</sup>McHarg, "Memo to Landscape Architecture and Regional Planning Faculty."

<sup>66</sup>Ibid.

to make it the brush and the paint of an artist and what he didn't understand was ... computational capability. So one of the most difficult things that I had to do with him was to get him to realize that when I intersected two polygons, they became more than two polygons and the information embedded in the database allowed me to display it any way I wanted. He was still stuck in display mode one and display mode two and trying to put the two displays together. And I was saying 'no, no, no, I've created something completely new now!' And he just couldn't get that. ... He didn't understand topology. He didn't understand topological structure even though that was to be the key of solving the suitability problem ... and that you could encode that in a table. He never understood that to his dying day.<sup>67</sup>

Indeed, McHarg saw the advantages of computer methods as primarily reducing the amount of time needed to iterate over scenarios. He was less interested in extending his approach than in streamlining it and in making the instructional point that ecological planning required mapping scenarios based on the divergent values of project stakeholders. Despite the early successes in digitization, as with the earlier period of experimentation with MacDougall at the helm, transitioning instruction into digital ways of working was not a frictionless process. A contemporaneous article in *Penn in Ink*, the newsletter of the school, notes wryly that "the tedium of producing analysis maps by hand has been replaced by the tedium of learning to map on the computer."<sup>68</sup> Kevin Murray, a student at the time, shares that his colleagues "were the ones working the bugs out," and the sentiment at the time was

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<sup>67</sup>Radke, interview.

<sup>68</sup>Judy Coutts, "Computers: A Revolutions at the GSFA?" *Penn in Ink* Spring (1985): 6.

that “the course was inherently frustrating.” Kim Sorvig, the teaching assistant responsible for a guidebook for conducting suitability analysis on the Integraph, said at the time that “adding the computer course requirement” compounded the difficulty of what was already known to be a “stressful course.”<sup>69</sup>

Despite these minor frustrations, McHarg’s computational optimism grew. Radke ‘computerized ecological planning’ and demonstrated the possibility of automating the overlay paradigm.<sup>70</sup> The successful vectorization of Medford data—geology, hydrology, soils, vegetation, land use, historic settlement, slope/aspect, water service areas, and sewer service areas—led to Radke’s conducting a suitability analysis by overlay.<sup>71</sup> A series of images conveys the change—from Chrometex on mylar in 1983 (fig. 3.9), to hatched digital polygons in 1986-87 (fig. 3.10), to marker-filled digital polygon outlines in 1988 (fig. 3.11).

### Computing Costs

By 1985, however, the digitized Medford files were costing McHarg and Radke a fortune. Invoices sent by Bill Glennie, the systems manager for the school’s computer lab, show that data storage alone was costing \$750/month for the project’s 15 megabytes. While this was initially paid for using funds from a \$23,000 United Parcel Service grant internal to the University of Pennsylvania, an application to renew this grant was not successful, leading to enormous financial tensions within the department.<sup>72</sup>

I raise the cost of computation because the department at this time was going through

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<sup>69</sup>Ibid., 6.

<sup>70</sup>Ian L. McHarg to Lee Copeland, January 2, 1986, 109 II.E.1.91, Dean Lee Copeland, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>71</sup>Ian L. McHarg and John Radke, “UPS Research Grant,” 1985, 109 II.E.1.110, Intergraph Computer, 1985-87, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>72</sup>Ibid.; William Glennie to Ian L. McHarg, November 18, 1985, 109 II.E.1.110, Intergraph Computer, 1985-87, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.



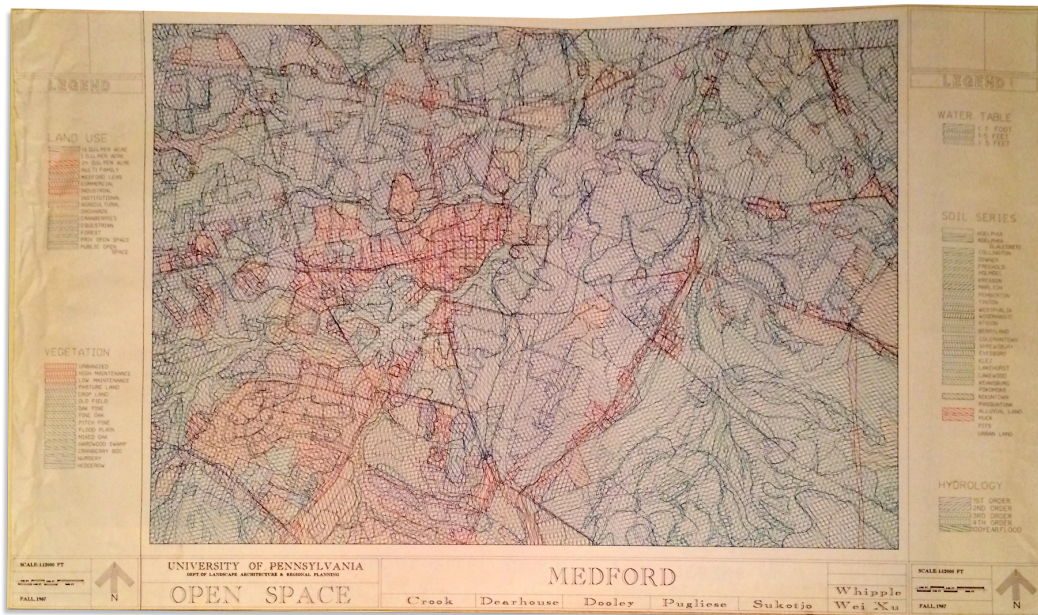
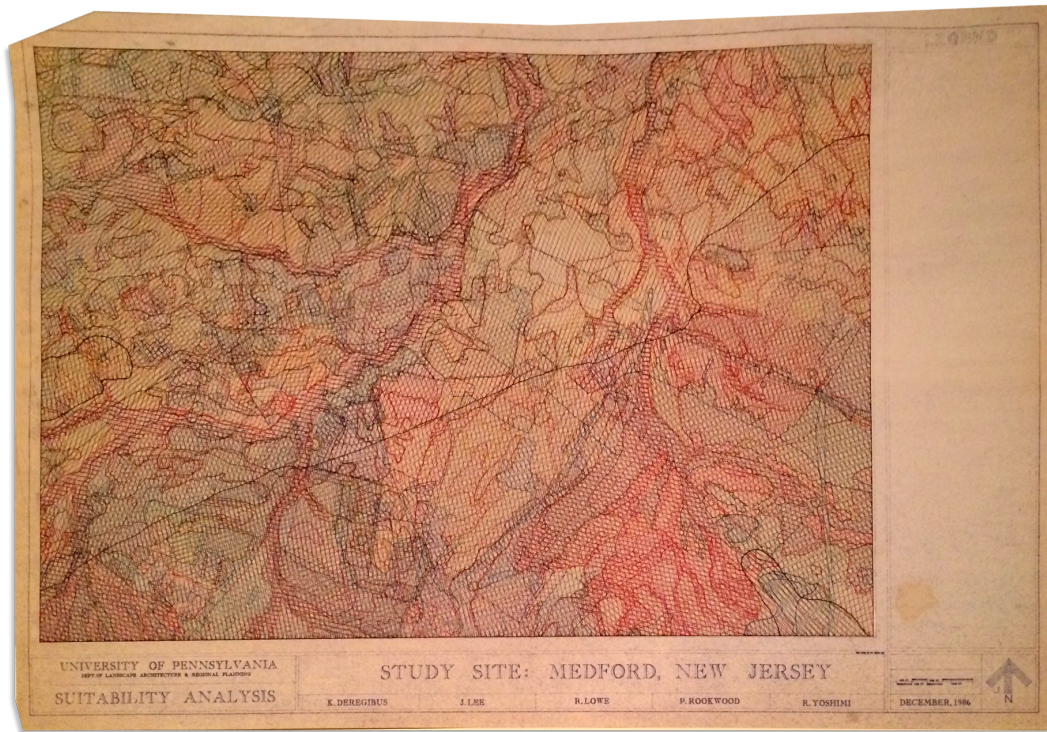


Figure 3.10: Map of the Medford site in 1986-87, produced by Intergraph. Image: Eric Robsky Huntley. Original: Architectural Archives, University of Pennsylvania.

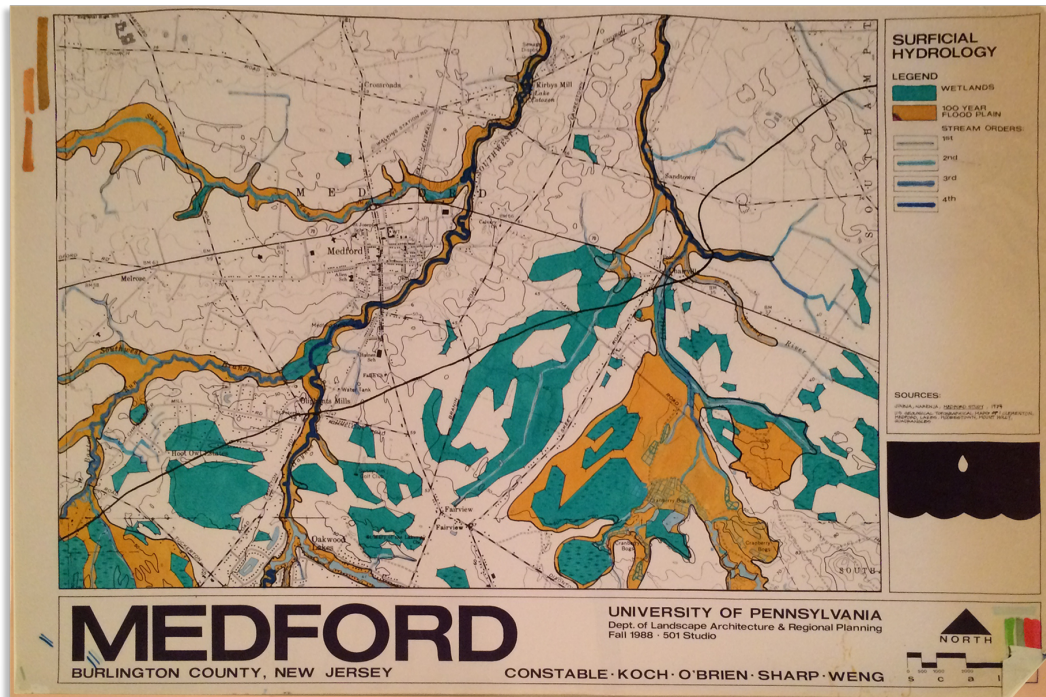
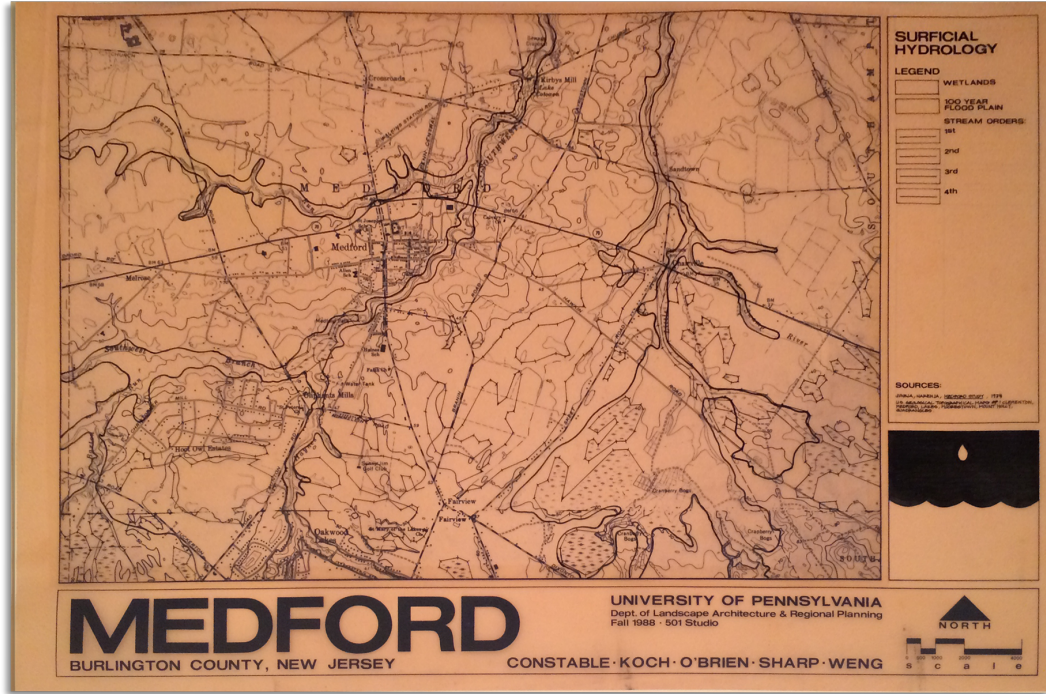


Figure 3.11: Maps of the Medford site in 1988-89, produced after the Intergraph was sold. Image: Eric Robsky Huntley. Original: Architectural Archives, University of Pennsylvania.

rather substantial structural change. In 1986-87, McHarg was pressured to resign as chairperson, a position he had held since he was invited to start the department in 1955. Anne Whiston Spirn, who had been McHarg's student and who had started her career at WMRT was hired on as chair. Sprin realized quickly that McHarg had not been terribly well-suited to his position's fiduciary role. She shared that when she came from Harvard University to take over as chair in 1986...

The department was about a quarter-million in the red. It was \$200,000 in 1986. I had the good sense, when I accepted the position, as part of my negotiations for the chair, I negotiated for the department. That's your one opportunity to negotiate for the department is when a chair is coming in from the outside. So I negotiated a hire for an assistant professor and I also negotiated that the budget would not be... I said what's the budget currently? I got a look at it and I got the promise that it wouldn't be reduced. But I didn't ask whether the current budget was in deficit. So when I arrived, they said "okay Anne, now you gotta do something about this \$200,000 deficit because you are never getting another faculty member until you deal with that."<sup>73</sup>

After being forced to resign as chair of the department, McHarg was encouraged to take a sabbatical. He spent it traveling and attempting to absorb the computational state of the art. He spent three months in Australia and New Zealand, where he learned about state environmental data collection; he spent a year in residence at Berkeley, where would begin seeking to expand the scalar remit and unit landscape of ecological inventories from the

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<sup>73</sup>Anne Whiston Spirn, interview by Eric Robsky Huntley, June 7, 2019.

nation to the globe. And he would begin proposing the same to geospatial practitioners at a series of GIS conferences. I focus here on the expansion of his scalar ambition underwritten by computational capacity and the globalization of environmental problems. As the globe became more graspable, its appeal as a form of evidence grew.

### 3.6 SEEKING THE STATE OF THE ART

In summer 1986, McHarg spent two months in New Zealand and Australia, partially under the auspices of the University of Auckland where he served as Foundation Professor.<sup>74</sup> He also spent time in residence in other academic planning and landscape architecture departments and state agencies throughout the region. At each, he gathered information on the techniques and technologies they deployed in the service of larger-scale and more thoroughly computerized ecological planning practices.

He visited the Scientific Mapping Unit of the Department of Scientific and Industrial Research (now the Crown Research Institute) in Wellington; the Department of Environment and Planning in Sydney; the University of Auckland Department of Town Planning; and the Ministry of Interior of Taiwan, to whom he offered training and consulting services (that he was frankly ill-equipped to provide).<sup>75</sup> He found these institutions somewhat wanting—far from the regional clusters of scientists coordinated by a federal agency he envisioned in the United States. At home, he had proposed (to largely deaf ears) a federalized system of scientific knowledge production. He advocated the same for Australia and New Zealand, going so far as to recommend hardware; specifically, hardware that matched facil-

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<sup>74</sup>“Faculty Notes,” *Penn in Ink*, 1986.

<sup>75</sup>Robert B. Smyth to Ian L. McHarg, September 10, 1986, 109 III.D.8, Australia/New Zealand (1986), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA; Ian L. McHarg to Lung-sheng Chang, August 13, 1986, 109 III.D.8, Australia/New Zealand (1986), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

ities at Penn. This was deliberate, and meant to position Penn as an appropriate partner for remunerative contracts. Indeed, in correspondance throughout this period, he frequently references changes in his computational capacity in Philadelphia where he was in the process of acquiring software and hardware, including an Intergraph Optronix 8040 scanner; an Interpro 32 workstation terminal for the mainframe VAX;<sup>76</sup> TIGRIS, an object-oriented GIS.<sup>778</sup>

The two visits, though, that made the greatest impact were visits to the Western Australia Department of Agriculture (WADoA) in Perth and in the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Canberra. At both WADA and CSIRO, he saw demonstrations of automated digitizing and vectorization approaches, which he described as the technological change that placed large-scale ecological inventories within the realm of possibility.<sup>79</sup> He was fascinated by datasets, and letters from this time were filled with acronyms of and requests for the same (many of which have fallen into obscurity).<sup>80</sup> He writes to representatives of CSIRO that, “given the ability to undertake automatic digitizing, automatic vectorizing of both mapped data, Landsat, and SPOT, automatic formation contouring, slope, aspect, and insolation with the enhanced capability of the Intergraph 32 to

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<sup>76</sup>David E. Weisberg, “Intergraph,” in *The Engineering Design Revolution*, accessed April 19, 2020, <http://www.cadhistory.net/>.

<sup>77</sup>John R. Herring, “TIGRIS: A Data Model for an Object-Oriented Geographic Information System,” *Computers & Geosciences*, GIS Design Models, 18, no. 4 (May 1, 1992): 443–52, doi:10.1016/0098-3004(92)90074-2.

<sup>78</sup>Ian L. McHarg to Robert Riddell, August 14, 1986, 109 III.D.8, Australia/New Zealand (1986), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA; Ian L. McHarg to Richard Walter, August 14, 1986, 109 III.D.8, Australia/New Zealand (1986), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>79</sup>Ian L. McHarg to Harry Turbott, August 14, 1986, 109 III.D.8, Australia/New Zealand (1986), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>80</sup>Ian L. McHarg to Henry Nix et al., August 12, 1986, 109 III.D.8, Australia/New Zealand (1986), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

handle overlays, the future looks rosy. ... I anticipate an exciting year ahead.”<sup>81</sup> ‘Automatic’ was the discursive driver of much investment at the time, in landscape architecture as well as geography.<sup>82</sup> The elimination of the manual labor associated with cartographic inquiry was seen to facilitate accumulation and layering—more datasets to describe regions more completely—but also extension—datasets of wider coverage capable of upscaling the unit landscape of ecological planning.

### 3.7 ‘A MORAL EQUIVALENT TO STAR WARS’: GAIA 2000

These visits would set the template for a variety of subsequent endeavors in which McHarg became not only an interested onlooker but a computational advocate. He spoke, for example, at the Hawaii Information Processing Conference at the Outrigger Prince Kuhio Hotel in Honolulu, January 1988.<sup>83</sup> His talk is given the generic title ‘geographic information systems’ in promotional materials. Even at this early date, the form of his analysis, in which layers are stacked to produce a vision of a site or region sufficiently complete for action, was identified with GIS. In addition to the scientific verticality of the layer, there was a horizontal ambition to ‘X-wideness’: state-wide, nation-wide, global. In this same trip to Hawaii, he addressed the Environmental Legislative Network *Focus on the 1988 State Legislature Workshop* and the Hawaii Senate. He spoke on GIS on both occasions. In these addresses, he advocated for state-wide environmental inventories, carried out with GIS, for the purposes of supporting planning decisions.

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<sup>81</sup>Ibid., n.p.

<sup>82</sup>Jerome E. Dobson, “Automated Geography,” *The Professional Geographer* 35, no. 2 (1983): 135–43, doi:10.1111/j.0033-0124.1983.00135.x; Jerome E. Dobson, “The Geographic Revolution: A Retrospective on the Age of Automated Geography,” *The Professional Geographer* 45, no. 4 (1993): 431–39, doi:10.1111/j.0033-0124.1993.00431.x.

<sup>83</sup>“Faculty Notes,” *Penn in Ink*, 1988.

This scalar ambition would expand during a year spent at Berkeley in 1986-87. While in the Bay Area, he met and reconnected with a range of scholars, some of whom were familiar faces from the U.S. environmental establishment (Luna Leopold, Paul Ehrlich, Ken Watts); some of whom were new acquaintances. They discussed, among other things, the prospect of a computerized global inventory which would grasp the planet as a salient scale for planning and governance. This is a project with which McHarg would spend several years, aggressively pursuing scientists and data brokers with the architect Sym Van der Ryn. Together, they imagined an ambitious program for upscaled environmental data capture.

Van der Ryn, then the state architect of California, was in the midst of a series of setbacks that arrived with the Reagan revolution. A prominent architect and technologist, he served as founder and president of the Farallones Institute, a think tank whose primary area of activity was the application of appropriate technologies to building construction. As state architect of California, his office had been home to the California Office of Appropriate Technology (OAT) in the late 1970s. This was due in part to broad Federal interest in 'appropriate technology', exemplified by the National Center for Appropriate Technology (NCAT), established by President Jimmy Carter in 1976. Carroll Pursell notes that, as these California and national initiatives were founded together, so too did they fall. Van der Ryn's OAT was abolished in 1982 with the election of Republican governor George Deukmejian; Ronald Reagan abolished the Community Services Administration, which had played home to the NCAT.<sup>84</sup> Ronald Reagan removed solar panels Carter had installed on the roof of the

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<sup>84</sup>Accounts of Van der Ryn's involvement with the appropriate technology movement can be found in Carroll Pursell, "The Rise and Fall of the Appropriate Technology Movement in the United States, 1965-1985," *Technology and Culture* 34, no. 3 (1993): 629-37, doi:10.2307/3106707; Carroll Pursell, "Sim van Der Ryn and the Architecture of the Appropriate Technology Movement," *Australasian Journal of American Studies* 28, no. 2 (2009): 17-30, <http://www.jstor.org/stable/41054144>; On his later turn towards ecological design in a changing climate, see David Moffat, "The Coming Ecologic Epoch: Sim van Der Ryn at EDRA," *Places* 19, no.

White House; these sat in storage until the early 1990s, when they were resold to sit atop the cafeteria at Unity College in Maine.<sup>85</sup>

Given broad changes in the political economy of technical and environmental expertise in the first years of the 1980s, McHarg and Van der Ryn were out of sync, together. The bureaucracies that had previously been their guarantors and sometimes-patrons were rapidly eroding. On meeting in Berkeley and locating the overlap in their visions—appropriate and ecologically-sound uses of technology—they jointly put forward a proposal imagining an enormously upscaled and computationally-enabled inventory of environmental systems. It was called “GAIA 2000”. In at least one iteration of the proposal, it bore the subtitle “A moral equivalent to star wars.”<sup>86</sup> A tight bundle of references to world-spanning theories. Gaia, the name given to the planet by Lovelock, Margulis and others, who thought it as a single organismic system; ‘star wars’, the name of the much-ridiculed Reagan-era nuclear defense program, reliant on a satellite sensor mesh. Gaia, complete and organismic, is held up as a ‘moral’ alternative to the planet, complete and militarized. Here is a last gasp of the scientized bureaucratic form of environmentalism that flourished under the post-Nixon federal environmental regime, enhanced by the promise of geocomputation.

The proposal took various forms between 1987-88. Initial vision documents described the necessity of developing “the most powerful instrument available to guide private and

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2 (2007): 82–83, <https://placesjournal.org/article/the-coming-ecological-epoch-sim-van-der-ryn-at-edra/>.

<sup>85</sup>“College Uses Panels Discarded by White House,” *The Chronicle of Higher Education*, July 1, 1992, <https://www.chronicle.com/article/College-Uses-Panels-Discarded/79883>.

<sup>86</sup>Ian L. McHarg and Sim Van der Ryn, “Digital World Inventory & Model: GAIA 2000,” n.d., 109.III.D.35, GAIA 2000: A computerized world model (1987), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA; Ian L. McHarg, “A Computerized World Model: Gaia 2000,” May 1987, 109.III.D.35, GAIA 2000: A computerized world model (1987), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA; Ian L. McHarg and Sim Van der Ryn, “GAIA 2000: A Computerized World Model (A Moral Equivalent to Star Wars),” May 1987, 109.III.D.35, GAIA 2000: A computerized world model (1987), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.



governmental policies as they affect national and planetary security”:<sup>87</sup> a “world model”, capable of assessing the impact of policy on ‘world futures’. The proposal was galvanized by both technological and social ferment: first, they asserted (rightly or wrongly) that “citizens are wearying of the forty year impasse between the US and USSR and the incredible misallocation of resources it has produced.”<sup>88</sup> More than Cold War-weariness, “assaults on planetary ecosystems resulting from development and economic policies are—along with nuclear war—the most serious threat to planetary security and well being”<sup>89</sup>.

As is implied by the subtitle—‘A moral equivalent to star wars’—the position of this piece vis-a-vis the military-industrial-academic complex is by no means laudatory. In acknowledging that the necessary data, hardware, and software all exist, they recognize that it is ‘ironic’ that these technologies are in the hands of the Defense Mapping Agency (DMA); the defense establishment gatekeeps extant data sets, including those describing bathymetry, and world vegetation (‘for cruise missile purposes,’ they surmise), thereby precluding environmentally sound decisions. The simultaneous desire for the environmental-informational capacities of military-industrial actors and the secretive culture of the intelligence community required enormous institutional change, to be designed and carried out by an expert task force of environmental scientists.

What was to come of such a complete model? McHarg and Ven der Ryn were designers, less interested in description than prescription. The enormity of anticipated environmental catastrophes...

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<sup>87</sup>McHarg and Van der Ryn, “GAIA 2000: A Computerized World Model (A Moral Equivalent to Star Wars),” 1.

<sup>88</sup>Ibid., 1.

<sup>89</sup>Ibid., 1.

- 1) Nuclear war
- 2) Limited nuclear war
- 3) nuclear winter
- 4) CO2 and world warming
- 5) Ozone
- 6) Pollution, and
- 7) Population<sup>90</sup>

...suggested not only the mustering of radical political change, but also the collection and assembly of environmental data. Earlier in his career, McHarg had codified the 'layer' as an epistemic response to 'ought' anxiety. Now, later, given the affordances of computerization, McHarg was attempting to articulate a horizontal response to 'ought' anxiety. If the anxious question 'what must we know to anticipate the worst' demanded an informational response, it was the globe alongside the layer that provided it. Even as the scalar ambition of data collection became planetary in scope, the vision for how cartographic information was to intersect with the polity remained exceedingly narrow. "Using computer mapping technology, coupled with computerized animation techniques, the results of various policies on regional and planetary environments can be displayed as a TV image readily understood by ordinary people."<sup>91</sup> While the stakes were high and the scale was large, the proposal adhered to a self-paraodically liberal knowledge-politics in which the problem was an information draught and the solution was the ability to consult an image or a library.

Despite the ambivalence expressed in these earlier framings of the GAIA project, the

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<sup>90</sup>McHarg, "A Computerized World Model: Gaia 2000," 3.

<sup>91</sup>McHarg and Van der Ryn, "GAIA 2000: A Computerized World Model (A Moral Equivalent to Star Wars)," n.p.

principals were ultimately compelled to seek the support of the military-industrial complex for a model of planetary scope. In Barnes's Althusserian parlance, they were 'hailed'... or at least attempting to hail themselves.<sup>92</sup> In July of 1987, Van der Ryn and McHarg had an extended discussion with DMA actors about the prospect of a digital world model at the agency's office in Washington, DC. The Deputy Director of Research and Engineering, Edward W. Finnegan convened the meeting. Representatives of the DMA gave technical presentations on available data products, the agency's production process, its Mapping, Charting, and Geodesy (MC&G) digital data formats, and standardization procedures.<sup>93</sup>

It's hard to imagine that the two designers weren't a bit mystified; a survey of military geodetics and ontologies likely exceeded the instrumental needs of the planning process as they imagined it. The proposition from Van der Ryn and McHarg was to fund and support "Geographic Information System Applications to Environmental Planning"—they avoided 'Gaia'-speak in addressing those in uniform.<sup>94</sup> Their proposal suggests both a constituency and a deficit: environmental planners and scientists are the primary non-defense users of GIS, but that these do not often know what non-classified information is available. Furthermore, there were scalar dimensions to the arrival of new constituencies; they propose an expert panel tasked with identifying critical issues and GIS needs for analysis at the global scale as well as applications of global expertise to issues at the 'sub-global' scale. If the horizontal extent of McHarg's unit landscapes had been expanding consistently since the 1960s,

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<sup>92</sup>"Geography's Underworld: The Military-Industrial Complex, Mathematical Modelling and the Quantitative Revolution," *Geoforum* 39, no. 1 (2008): 3-16, doi:10.1016/j.geoforum.2007.09.006.

<sup>93</sup>"Agenda and Notes for Meeting at the Defense Mapping Agency," July 22, 1987, 109.III.D.33, GAIA 2000: A computerized world model (1987), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>94</sup>Sim Van der Ryn and Ian L. McHarg, "Geographic Information System Applications to Environmental Planning (Draft Concept Proposal to the US Defense Mapping Agency)," July 1987, 109.III.D.35, GAIA 2000: A computerized world model (1987), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

in this case the proposal was to come down from the globe; the U.S. military apparatus needed no spur to scalar ambition. Rather, they needed guidance by environmental experts aware of the potential for sub-global (and civilian) applications.

The same month as the meeting with DMA, Van der Ryn introduced McHarg to Barbara Boxer, then Democratic Representative of Marin County, California and then-member of the House Appropriations Subcommittee on Defense. Boxer brought Van der Ryn and McHarg back around to DMA, arranging a joint meeting with the agency's General Robert Rosenberg. The designers proposed that defense resources be set aside for the creation of a world model. Boxer intimated in the meeting that she intended to write an appropriations bill for \$40 million to fund a world model and inventory.<sup>95</sup> No such bill was ever introduced. Similarly, though Rosenberg's staff would keep McHarg informed of their efforts to produce a land cover data set by digitizing Operational Navigational charts, the eventual contract went elsewhere.

The GAIA 2000 proposal ultimately took on a form consistent with the authors' adherence to an older model of environmental professionalism; this was laid out in a January 1988 proposal to the Pew Charitable Trusts of Philadelphia.<sup>96</sup> The proposal is for funds to underwrite a conference convening sixty scientists involved or interested in the global collection of environmental data. The proposal gradually grew from a relatively modest \$50,000 gathering to a \$200,000 agenda-setting event in Woods Hole, MA. Representatives of data-

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<sup>95</sup>Ian L. McHarg to Jon M. Jenson, September 1, 1987, 109.III.D.34, GAIA 2000 Correspondance (1987-88), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>96</sup>Ian L. McHarg, "A Proposal to the Pew Charitable Trusts, Philadelphia from Ian McHarg to Support an International Conference GAIA 2000 to Consider a Computerized World Ecological Inventory," January 1988, 109 II.C.83 Proposal to the Pew Charitable Trusts to Support a International Conference GAIA 2000/A Global Digital Environmental Inventory and Models (1988), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

collecting organizations—CIA, NOAA, USGS, UNEP, FAO, NASA, DMA—would present and open the environmental assets of the military, state, and intergovernmental agencies to civilian scientists. While many agencies, scientists, and centers were pursuing individual data sets with global coverage, the proposal hinged on the notion that synthesis was of less interest to existing institutions. This is an exaggeration; by this time, many intergovernmental organizations were working to make their datasets interoperable. However, the proposal also called to channel existing environmental data super-abundance into a galvanizing aesthetic spectacle: “this will be an historic event, the first time existing world data will be assembled in one location and displayed to an audience.”<sup>97</sup>

Such a galvanic moment would send energies and artifacts rippling outward along many lines of inquiry. Products from the conference would be useful in the context of descriptive, predictive, and evaluative modeling addressed to a laundry list of environmental threats, ills, and events. The trans-agency, trans-disciplinary collaboration resulting from efforts to conduct an inventory at the scale of the globe would inform the work of those “modelling [sic] CO<sub>2</sub>, world warming, sea level rise and inundation, desertification, ozone attenuation, nuclear war, [and] nuclear winter.”<sup>98</sup> It would incite the earth’s very geology to speak of its plans plans by facilitating scientific inquiry into “predicting catastrophes, volcanoes, earthquakes, tsunamis, hurricanes, tornados, floods, [and] droughts.” In addition to predicting future exogenous catastrophe, GAIA 2000 would aid those assessing the marks made by human processes, “computing consequences of pollution, deforestation, erosion, sedimentation, subsidence, [and] urbanization.”<sup>99</sup>

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<sup>97</sup>Ibid., n.p.

<sup>98</sup>Ibid., n.p.

<sup>99</sup>Ibid., n.p.

A list of scientists accompanied the proposal, a list which had been evolving with each phone call McHarg made to members of the environmental and state elite. I see this effort as an attempt to construct layered inter-disciplinarity along global lines: something like a *Man's Role in Changing the Face of the Earth* for the mid-1980s (see fig. 3.12 - fig. 3.14). The goal was to construct a venue for the conduct of interdisciplinarity, but with applications to the global scale. Geocomputation permitted, at least for McHarg, the aesthetically satisfying imagination of a whole earth whose systems were represented, stored, and acted upon.

A liberal knowledge-political dream, indeed. We are given an unusually focused look at McHarg's knowledge politics by an outside arbiter in an interview conducted for the student *Berkeley Planning Journal* in 1988. The interlocutor asks very directed questions regarding the relationship between knowing and future-making, in which McHarg reveals a sort of anti-ideological political ambivalence:

The problem of political action is difficult. I find it impossible to distinguish the environmental policies of corporate capitalists from bureaucratic communists or socialist states. They seem united in disinterest. The Green Party may be the single exception to prove the rule. On the other hand, I am impressed with the political power of the grass roots environmental movement in the 70's and the anti-nuclear cause in the 1980s, notably Physicians for Social Responsibility. I support Audubon, Sierra Club, Natural Resources Defense Council, Friends of the Earth, Greenpeace, etc., etc. although it is fair to say that, while they began with distinguished scientists as spokesmen, they are now lobbyists..<sup>100</sup>

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<sup>100</sup>Ian L. McHarg and Cliff Ellis, "Ian McHarg on City Planning," *Berkeley Planning Journal* 3, no. 2 (1988): 51.

GAIA 2000

~~From: Eric Robsky~~ Interlinked Scientists

Foot:

		Ronald Abler	NSF
		Francis Bruckner	U. Wisc.
Dean Abrahamson	Univ Minn.	Karin Burke,	Houston
Orlando Alvarez	Berkeley	Norman Collins,	Ford Fender
Thomas Cochran	NRDC	Barcan Choudhury	NASA
Robert N Colwell	Berkeley	Mike Cochrane	JPL
Paul Ehrlich	Stanford	Jim Dickson	JPL
Ann Ehrlich	Stanford	Jesse Dengermond	ES&I
Peter Gleick	Berkeley	Kath Elliott	USCS
Jack Geiger	NY	Charles Elachi	JPL
John Harte	Berkeley	James Garvan	NASA
John Holdren	Berkeley	John Houghton	USGS
Harold Johnson	Berkeley	Steve Gupta	USGS
Lena Leopold	Berkeley	John Jensen,	Pew Charitable Trust
William McKernic	Berkeley	Donna Tordy	North Western Univ.
Karl Z Morgan <sup>as</sup>	Oak Ridge	Cliff Koltman	DMA
Paul Shepard	Fitzer	Vincent Salmonson	NASA
Robert Twiss	Berkeley	Steven Schneider	ENCAR
Frank von Hippel	Princeton	Nicholas Short	NASA
Edward Radford	Oxford	William Stoney	RCA
Kenneth Walt	Davis	Locke Stuart	NASA
George Woodwell	Woods Hole	Tim Tucker	NASA
John Radke		Robert Speed	Northwestern Univ
		Dr Robert Gurney	NASA

Figure 3.12: A provisional list of scientists invited to the GAIA 2000 conference. Image: Eric Robsky Huntley. Original: Architectural Archives, University of Pennsylvania.

Provisional List of Invited Scientists

Dr. Ronald Abler	NSF, Washington, DC
Dr. Dean Abrahamson	University of Massachusetts, Minneapolis, Minnesota
Dr. Orlando Alvarez	University of California, Berkeley, California
Dr. Greg Beeston	Government of Western Australia, Perth, Australia
Ms. Barbara Boxer	Congresswoman for Marin County, Sausalito, California
Dr. James Broadus	
Dr. Francis Brotherton	University of Wisconsin, Madison, Wisconsin
Dr. Kevin Burke	Lunar & Planning Research, Houston, Texas
Dr. Bascar Choudhury	NASA, Goddard, Maryland
Dr. Mike Cobrich	JPL, Los Angeles, California
Dr. Thomas Cochrane	NRDC, Washington, DC
Dr. Norman Collins	Ford Foundation, New York, New York
Dr. Robert N. Colwell	University of California, Berkeley, California
Dr. Terence Coppock	Edinburgh University, Edinburgh, Scotland
Dr. _____ Coxe	CSIRO, Canberra, Australia
Dr. Ian Crain	Environment Canada, Ottawa, Canada
Dr. _____ Croce	UNEP, Nairobi
Dr. Jack Dangermond	ESRI, Los Angeles, California
Dr. Tim Dickson	JPL, Los Angeles, California
Dr. Anne Ehrlich	Stanford University, Palo Alto, California
Dr. Paul Ehrlich	Stanford University, Palo Alto, California
Dr. Keith Elliott	USGS, Reston, Virginia
Dr. James Garvan	NASA, Goddard, Maryland
Dr. Jack Geiger	City College of New York, New York, New York
Dr. Peter Gleick	University of California, Berkeley, California
Dr. Robert Gurney	NASA, Goddard, Maryland
Dr. Steven Guptill	USGS, Reston, Virginia
Dr. John Harte	University of California, Berkeley, California
Dr. John Holdren	University of California, Berkeley, California
Dr. John Houghton	USGS, Reston, Virginia
Dr. John Ive	CSIRO, Canberra, Australia
Dr. John Jenson	Pew Charitable Trusts, Philadelphia, Pennsylvania
Dr. Donna Jurdy	Northwestern University, Chicago, Illinois
Dr. Harold Johnson	University of California, Berkeley, California
Dr. Cliff Kottman	DMA, Washington, DC
Dr. Luna Leopold	University of California, Berkeley, California

*Figure 3.13: Part one of a provisional list of scientists invited to the GAIA 2000 conference. Image: Eric Robsky Huntley. Original: Architectural Archives, University of Pennsylvania.*



Dr. Lynn Margulis	Boston University, Boston, Massachusetts
Dr. William McKenzie	Lawrence Livermore Lab, Berkeley, California
Prof. Ian L. McHarg	University of Pennsylvania, Philadelphia, Pennsylvania
Dr. Karl Z. Morgan	Oak Ridge, Tennessee
Dr. Edward Radford	Oxford, England
Dr. John Radke	University of Pennsylvania, Philadelphia, Pennsylvania
Dr. Vincent Salmonson	NASA, Goddard, Maryland
Dr. Steven Schneider	NOAA, Boulder, Colorado
Dr. Nicholas Short	NASA, Goddard, Maryland
Dr. Paul Sheperd	Pfizer College, Los Angeles, California
Dr. Robert Speed	Northwestern University, Chicago, Illinois
Dr. Gus Speth	World Resources Institute, Washington, DC
Dr. William Stoney	RCA, Princeton, New Jersey
Dr. Locke Stuart	NASA, Goddard, Maryland
Dr. Shelby Tilford	NASA, Washington, DC
Dr. Jim Tucker	NASA, Goddard, Maryland
Dr. Robert Twiss	University of California, Berkeley, California
Prof. Sym van der Ryn	University of California, Berkeley, California
Dr. Frank von Hippel	Princeton University, Princeton, New Jersey
Dr. Kenneth Watt	University of California, Davis, California
Dr. M. Gordon Wolman	John Hopkins University, Baltimore, Maryland
Dr. George Woodwell	Woods Hole, Massachusetts

**Landsat**

"Spot" Representative/s

Soviet Satellite Imaging Representative/s

Industry Representation

Arc/Info  
 DEC VAX  
 Intergraph  
 Scitex  
 Optronix  
 Geo Vision  
 Gould  
 IBM

Figure 3.14: Part two of a provisional list of scientists invited to the GAIA 2000 conference. Image: Eric Robsky Huntley. Original: Architectural Archives, University of Pennsylvania.

This is very simplistic and does not entertain the possibility that even ‘distinguished scientists’ may have always functioned in the service of lobbyists (to a greater degree than the conventionally less-distinguished!). But there is a kernel of truth in it, insofar as McHarg outlines his great disappointment with how the potentials of scientized policy were co-opted by a bureaucracy given over to ‘best practice’ and the maintenance of the status quo.<sup>101</sup> As I trace in the previous chapter, the alignment between Penn landscape architecture and the environmental establishment was tight, constructed around a particular mid-century vision of inter- and trans-disciplinarity that I call ‘layering.’ Despite his disenfranchisement with the *actors* that carried the dream of ecological holism, he remains committed to its animating liberal ideology of informed decision-making.

I fear that my trust continues to lie with information. In a democracy, one must abide by the decision of the majority. However, good judgement needs good information; information is power. So I prefer to advocate the acquisition of data, improvement in interpretation, modeling, increased capability to predict the environmental consequences of contemplated actions, wide dissemination of these data, and, of course, the access afforded by television and the utility of the telephone for referenda.<sup>102</sup>

Computation had much to do with such a vision, a point that was rightly read as contrary to the analyses of prior counter-cultural figureheads. Ellis, the interviewer notes that “sometimes the computer has been linked with centralized power and homogenization. Your po-

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<sup>101</sup>Gottlieb, *Forcing the Spring: The Transformation of the American Environmental Movement*; Barker, “The Liberal Foundations of Environmentalism: Revisiting the Rockefeller-Ford Connection.”

<sup>102</sup>McHarg and Ellis, “Ian McHarg on City Planning,” 51.

sition is that the computer vastly increases our ability to accommodate social diversity. At least, it can be used that way.”<sup>103</sup> Contra the counter-culture whose analysis of computation circled around questions of bureaucratization, alienation, and subjugation, Mcharg envisions the role of geocomputation in bringing about greater democratization, though not of the radical type envisioned by Stewart Brand.<sup>104</sup>

We could take any proposal anybody wants to make and identify all of the people who are going to be impacted, determine their hierarchy of values, and then assess the costs and benefits of the proposed intervention on each constituency. Ultimately, that could be the basis for a referendum. All you need is a television system, a computer, and telephones; everybody who wants to can phone in their position on the matter in question, saying either yes or no.<sup>105</sup>

Ecological planning as telethon, informational democracy as an exercise in holding as unchallenged the validity of representations. The aesthetics of magnitude are guarantors of the democratic process in liberal democracy by carto-informatic means.

### 3.8 THINK GLOBALLY, GISCIENTIST!

Even as McHarg was driving towards an empirical earth, horizontally extending the imagined unit landscape of ecological planning to encompass the planet, the GIS community was moving in tandem. Many were beginning to approach the notion of national and planetary databases as more-than aspirational. McHarg’s computational turn towards the earth corresponded with the institutionalization of GIS among geographers, or at least that small subset

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<sup>103</sup>Ibid., 51.

<sup>104</sup>Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*.

<sup>105</sup>McHarg and Ellis, “Ian McHarg on City Planning,” 51.

concerning themselves with geocomputation. McHarg's aspiration was consistent with the *zeitgeist* at least insofar as its interest was in how to construct the computational conditions permitting the assembly of global knowledge. However, McHarg's approach was in other ways a relic of an older model of assembly. The becoming-global of expertise was accompanied by an epistemic layer model in which transdisciplinary encounters were understood to spawn radically new approaches. I would hearken back to *Man's Role in Changing the Face of the Earth*; I would hearken back to *Beauty for America*; I would hearken back to the Space Cadets of NIMH, who assembled a book about urban ecology, supported by the National Institute for Mental Health, after they consolidated their contributions at an annual meeting of a children's health professional society. The forms of knowledge assembly to which McHarg hewed were incommensurable with scientific inquiry as it was then understood.

The U.S.G.S. had launched the National Cartographic Information Center in the mid-1970s, and while it was meant to coordinate and take stock more than to centralize, its mission nevertheless bore a striking similarity to the approach taken by McHarg and Van der Ryn. The 1988 meeting of the International Geographical Union was on global information systems; in fact, McHarg made a request to Jack Dangermond that he be added to the meeting as a late attendee. Dangermond "requested that [the IGU] consider [McHarg] as an attendee," but was certain that the agenda was "well set and it is a small and select group in the digital global data base field who have been chosen."<sup>106</sup> McHarg's request went unaccommodated and he was not granted an invitation to a conference that saw many GIScientists—Tomlinson, Goodchild, Tober, Simonett—discussing the problems posed by the planet.<sup>107</sup>

<sup>106</sup>Jack Dangermond to Ian L. McHarg, November 2, 1987, 109 III.D.34, GAIA 2000 Correspondence (1987-88), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>107</sup>Helen Mounsey and Roger Tomlinson, eds., *Building Databases for Global Science: The Proceedings of the*

At the same time, McHarg was in conversation with Ronald Alber, then president of the Association of American Geographers Geographers (AAG) and director of the National Science Foundation (NSF) program in Geography and Regional Science. The NSF was announcing its intention to fund a National Center for Geographic Information and Analysis (NCGIA), to be hosted at one or more Universities, concerned with basic research in geographical analysis.<sup>108</sup> Even computer scientists were beginning to pay attention. John Radke suggested in an interview that one of the early applications of PostgreSQL, Sequoia 2000, was iterated out of GAIA 2000.<sup>109</sup> This project—whose home page is still available—was “intended to produce advances in earth science, computer tools with which to do earth science.”<sup>110</sup> It was a key moment for the consolidation of geospatial expertise in the academy. And it was precisely at this juncture that McHarg was becoming present within the professional circuitry of the GIS industry.

#### Expert Information Systems

Even as McHarg was becoming-computational, his home department was becoming less so. While he was at Berkeley, the college sold the Intergraph computer that had formed the basis for its expansion into geocomputation. The ventures he had begun to undertake around global data were “thwarted by the sale of the Intergraph,” and he had lost all “prospects of undertaking funded research.”<sup>111</sup> McHarg managed to temporarily borrow a machine

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*First Meeting of the International Geographical Union Global Database Planning Project, Held at Tylney Hall, Hampshire, UK, 9-13 May 1988* (Philadelphia, PA: Taylor & Francis, 1988).

<sup>108</sup>Ronald F. Abler, “What Shall We Say? To Whom Shall We Speak?” *Annals of the Association of American Geographers* 77, no. 4 (1987): 511–24, doi:10.1111/j.1467-8306.1987.tb00177.x; Ronald F. Abler, “The National Science Foundation National Center for Geographic Information and Analysis,” *International Journal of Geographical Information Systems* 1, no. 4 (1987): 303–26, doi:10.1080/02693798708927819.

<sup>109</sup>Radke, interview.

<sup>110</sup>“Sequoia 2000 Home Page,” May 16, 1994, [http://meteora.ucsd.edu/s2k/s2k\\_home.html](http://meteora.ucsd.edu/s2k/s2k_home.html), n.p.

<sup>111</sup>Ian L. McHarg to Anne Whiston Spirn, April 28, 1987, 109 II.E.1.115, Letter to Anne Spirn: Future Role at Penn, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA, n.p.

from Intergraph on the strength of his reputation as a salesperson of their product and the frequency of “activities on [their] behalf”<sup>112</sup>—these included demonstrations to state agencies given while in Australia and New Zealand, discussed above. Even as McHarg paid for maintenance of this system out-of-pocket, his former colleague at Penn Jon Berger and his partner Kit Wallace reached out to solicit his support for a new firm, Expert Information Systems, Inc., an “innovative business in the field of computer mapping and analysis.”<sup>113</sup> In addition to fronting capital, McHarg joined as a partner, and temporarily secured for the firm a donated Intergraph and peripherals on the basis of his active salesmanship. In the firm’s business plan, they frame their work as an outgrowth of the Computer Information and Analysis Laboratory at UPenn, with no mention of its current computerlessness. They draw an explicit parallel between this Philadelphia hub of activity and the commercially funded approach of MIT and Stanford, who had innovated the spin-off “which resulted in millions of dollars being made commercially by investors.”<sup>114</sup>

The partners tossed around other names. Computerized Ecological Planning (CEP). Design with Nature, Incorporated. Design with Nature GIS, Incorporated.<sup>115</sup> However, ‘EIS’ remained, a perhaps inadvertantly punning recognition of the transformation of McHarg’s legacy: from ecological thinker and proselyte of a specific kind of spiritualized environmentalism to a progenitor of approaches that would form the conceptual and methodological underpinnings of a certain kind of GIS analysis. EIS is also the acronym used to designate

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<sup>112</sup>Ian L. McHarg to Ed Downing, July 8, 1987, 109.II.A.2.17, Computer (1987-89), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>113</sup>Jon Berger, John Radke, and Kit Wallace, “A Business Plan for Expert Information Systems, Inc.” May 5, 1987, 9, 109 II.A.2.13, Jon Berger (1987), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>114</sup>Ibid., 9; for discussion of this model, see Leslie, *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford*.

<sup>115</sup>Ian L. McHarg, “Miscellaneous Notes,” n.d., 109.V.C.21.61, Miscellaneous Notes, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

the *environmental impact statement*, a process mandated by the EPA for new developments and infrastructure projects with substantive environmental impacts (and that the partners could likely imagine pursuing as contracts). In fact, given McHarg's proximity to the EPA, he is often credited with founding the EIS process, even as he is also credited with contributing enormously to GIS.<sup>116</sup> EIS was incorporated in Philadelphia, PA on July 20, 1987.

## Keynotes

Under the auspices of this firm, McHarg became a regular speaker at GIS conferences in the 1980s. He gave a keynote at the GIS '87 Conference in San Francisco on Tuesday, October 27, sponsored by the American Society for Photogrammetry and Remote Sensing (ASPRS) and hosted by the University of California, Berkeley's Department of Forestry and Research Management. While I can find no documentation of this keynote (it doesn't appear in the conference proceedings), a letter sent from the conference organizers to McHarg says that they look forward to his remarks on the 'role of geographic information systems in the environmental decision-making process'. His address was about the prospect of global inventories, and led to correspondence with e.g., the the U.S. Department of Agriculture (DOA)

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<sup>116</sup>I am compelled to relegate to a footnote an area that deserved more thorough inquiry. As discussed above, McHarg was well-connected in the milieu of conservationists, bureaucrats, and scientists to which early EPA directors, including William Reilly, turned. He is frequently cited in guides to the EIS process; (for example Ronald E. Bass, Albert I. Herson, and Kenneth M. Bogdan, *The NEPA Book: A Step-by-Step Guide on How to Comply with the National Environmental Policy Act* (Point Arena, CA: Solano Press Books, 2001); Diiori L. Kreske, *Environmental Impact Statements: A Practical Guide for Agencies, Citizens, and Consultants* (Hoboken, NJ: John Wiley & Sons, 1996)), and adjacent literature on landscape performance (Bo Yang, *Landscape Performance: Ian McHarg's Ecological Planning in the Woodlands, Texas*, Research in Landscape and Environmental Design (New York, NY: Routledge, 2019)). However, though it is likely that he and his partners were seeking EIS contracts in proposing the name, McHarg was no great supporter of the way they were institutionalized in the EPA. He describes the EIS process as, "ad hoc, adventitious, and can be negative. That is, the sum of environmental impact analyses for projects in a region does not contribute to an understanding of that region as an interactive biophysical system", Ian L. McHarg and Frederick R. Steiner, eds., "Biological Alternatives to Water Pollution," in *To Heal the Earth: Selected Writings of Ian L. McHarg* (Washington, DC: Island Press, 2007), 234–41, 239. Exactly how McHarg did or did not contribute to the early process remains to a question unanswered by environmental historians.

and others requesting further information on the ‘World Ecological Inventory’, and the 1974 *Comprehensive Plan* for the EPA.<sup>117</sup> The Forest Service of the DOA was also soliciting papers for a conference it was convening: the *International Conference and Workshop on Global Natural Resource Monitoring and Assessment: Preparing for the 21st Century in Venice, Italy* (Sept 24- 30)<sup>118</sup> His participation at this conference likely led to an opportunity to appear in promotional and educational materials developed by ASPRS and ASCM, including a video titled ‘The exciting new world of GIS.’<sup>119</sup>

McHarg also attended the April 1988 meetings of the World Resources Institute (WRI), a young think tank funded in 1982 by Gus Speth with support from the MacArthur Foundation.<sup>120</sup> Speth had been co-founder of the NRDC, and past chair of the U.S. Council on Environmental Quality under the administration of Jimmy Carter; Speth’s involvement in world resource management—and his establishment credentials—remind us that the world of philanthropically-endowed conservation and natural resources was beginning to turn towards the globe as a scale for action. In Speth’s words, “we were building a fool’s paradise. We seemed to be making real progress on domestic environmental issues during that era, but the large-scale global issues were not being addressed”<sup>121</sup> At the 1987 meeting, McHarg pitched GAIA 2000 to John “Terry” Coppock, a geographer and then-editor of the *International Journal of Geographic Information Systems*; Coppock had attended the first meeting of

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<sup>117</sup>Gyde Lund to Ian L. McHarg, November 4, 1987, 109.III.D.34, GAIA 2000: Correspondence (1987-88), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>118</sup>J.T. Coppock to Ian L. McHarg, June 12, 1988, 109 II.A.2.44, Geographic Information Systems Conferences (1988), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>119</sup>Donald F. Hemenway Jr. to Ian L. McHarg, March 29, 1988, 109 II.A.2.47, H General Correspondence, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>120</sup>Coppock to McHarg, June 12, 1988; John M. Broder, “Climate Change Envoy to Lead Influential Institute,” *Green Blog*, March 14, 2012, <https://green.blogs.nytimes.com/2012/03/14/climate-change-envoy-to-lead-influential-institute/>.

<sup>121</sup>“The WRI Story: 30 Years of Big Ideas,” *World Resources Institute*, 2013, <https://www.wri.org/wri-story-30-years-big-ideas>, n.p.



the International Geographical Union's Global Database Planning Project to which McHarg was not invited.<sup>122</sup>

He gave a keynote at Towson State University's GIS Symposium on June 2, 1988 sponsored by that University's Department of Geography and Environmental Planning, and the Maryland Chapter of the American Planning Association. The National Cartographic Information Center (NCIC) reached out following the symposium, inquiring after the attempt to acquire descriptive information on global coverage datasets for the "Sources for Digital Spatial Data" catalog.<sup>123</sup> A laudatory note from William Kirwin (of William Kirwin, Inc.) shares that McHarg's "pre-meeting remarks were so interesting that many of the people I associated with during the course of the day remarked that we must apply the brain to reconcile man/environment relationships."<sup>124</sup>

McHarg also gave a keynote address to a GIS Symposium sponsored by the Mid States Division of the AAG and hosted at Kutztown University on "Applications of Geographic Information Systems." The symposium was meant to introduce the "'hottest' topic in spatial data handling and mapping" to novices and geographers untrained in the computational arts. Over a 'Pennsylvania Dutch Feast' in September 1988, McHarg gave his address, beginning, as he often did, with a parable: a parable of 'man' as a planetary disease, and future microbes, whose world has been devastated by world warming and/or nuclear winter, deciding that in future stages of evolution they would not introduce the destructive brain. The

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<sup>122</sup>These were published in Mounsey and Tomlinson, *Building Databases for Global Science: The Proceedings of the First Meeting of the International Geographical Union Global Database Planning Project, Held at Tylney Hall, Hampshire, UK, 9-13 May 1988*, included papers from Goodchild, Tobler, Marble, David Simonett.

<sup>123</sup>Keith H. Elliott to Ian L. McHarg, June 7, 1988, 109.II.A.2.26, E Misc, Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>124</sup>William F. Kerwin to Ian L. McHarg, June 20, 1988, 109 II.A.2.44, Geographic Information Systems Conferences (1988), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA, n.p.

cyborg theory of technology was introduced, in which axes, knives, and spears came to the aid of human musculature, telescopes and microscopes came to the aid of the eye, and radios, satellites, and telephones came to the aid of the voice.<sup>125</sup>

Computation took its place the prosthetic capable of augmenting the faculties of the brain for purposes of landscape planning. But here, the unit landscape, following work on the GAIA 2000 project, became global. Citing the works of Lovelock and Margulis, he envisioned GAIA in public, imagining a planetary planning-support system in which ecological inventories determined the outcome of planning decisions, anticipating and thereby preventing the arrival of futures characterized by further environmental despoilation.

### 3.9 LAST GASPS

In December 1988, George H. W. Bush named William ‘Bill’ Reilly administrator of the Environmental Protection Agency. Reilly, a graduate of Harvard Law School with a master’s degree in urban planning from Columbia University, was a professional environmentalist who was then serving as President of the Conservation Foundation. He previously served as senior staff on President Jimmy Carter’s Council on Environmental Quality (CEQ) under Russell Train, another past president of the Conservation Foundation on whose direction a grant was made to Ian McHarg to write *Design with Nature*. Train would become the second administrator of the EPA. Speaking to the *New York Times* on the occasion of Reilly’s nomination, a spokesperson for the Chemical Manufacturers Association—hardly a friend of the environmental movement—praised Reilly as having “a reputation for focusing on solutions

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<sup>125</sup>Percy H. Dougherty to Geographers and Planners, “Invitation to Attend GIS Symposium,” August 24, 1988, 109 II.A.2.44, Geographic Information Systems Conferences (1988), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA; “Faculty Notes,” *Penn in Ink*, 1989.

to environmental problems, not on polemics.”<sup>126</sup>

McHarg reached out to Reilly on the occasion of his nomination to remind Reilly of the unrealized *Comprehensive Plan* of 1973. He informed Reilly that he was at work coordinating with other scientists engaged in collecting digital environmental data and that the ‘skeleton’ of a world ecological database existed, fragmented among dozens of scientific groups and intergovernmental agencies. Finally, he offered his services, speaking as one with access to “one of the finest spatial micro-computer labs in the country” and the ear of Representative Barbara Boxer and General Rosenberg of the DMA.<sup>127</sup> He is of course exaggerating his relationship to these figures quite dramatically, but nevertheless this correspondance yielded results: EIS was hired as a consultant to assess and analyze available national databases.

However, instead of doing this, the consultants proposed a plan for the thoroughgoing reconstitution of the agency’s governance and composition, essentially reproposing the same structure WMRT had proposed in the *Comprehensive Plan* of 1974. They propose both a national inventory of environmental systems and a reorganization around the broad interdisciplinary lines referenced in the previous chapter. Where the charge of the grant provided was to assess and inventory extant databases, the proposition made with greatest force was the total reorganization of the EPA.<sup>128</sup>

The agency’s Environmental Monitoring and Assessment Program (EMAP) drew par-

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<sup>126</sup>Philip Shabecoff, “William Kane Reilly: Environmental Protection Agency Administrator,” *The New York Times*, December 23, 1988, 25; William K. Reilly, interview by Dennis Williams, September 1995, <https://archive.epa.gov/epa/aboutepa/william-k-reilly-oral-history-interview.html>.

<sup>127</sup>Ian L. McHarg to Anne Whiston Spirn, October 6, 1989, 109 II.A.2.92, Regional Planning Committee (1989), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA; Ian L. McHarg to Clarence Davis, April 21, 1989, 109 II.A.2.31, EPA/William Reilly (1990), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

<sup>128</sup>Ian L. McHarg et al., “A Database Prototype for a National Ecological Inventory” (Philadelphia, PA: Expert Information Systems, 1992), 109.II.C.22, A Database Prototype for a National Ecological Inventory (1992), Ian L. McHarg Collection, Architectural Archives, University of Pennsylvania, Philadelphia, PA.

ticular ire. This ecological monitoring program ran from 1990-2006, and developed indicators and designed approaches to the aggregation and acquisition of the same.<sup>129</sup> The initial scope of the program, though, according to the EIS collaborators, was inadequate for scalar reasons, unable to realize the promise of rigorous planning informed by spatial-ecological databases. As a pilot project, EMAP partitioned the land area of the United States into 40km<sup>2</sup> hexagonal sites and undertook a detailed study of 6% of these. This was seen as inadequate for one of the primary tasks of ecological inventory: identifying the unit landscapes of ecological planning. Furthermore, the narrow disciplinary scope of the program was to its detriment. The characterization of landscapes required not only complete data, but “interdisciplinary science culminating in integration and synthesis.”<sup>130</sup> Data deficiencies were no longer the greatest hurdle facing environmental inventories: “having undertaken an exhaustive search, we are in a position to record that data are superabundant although of variable quality.”<sup>131</sup> We might hear prescient echoes of contemporary discourse around data magnitude<sup>132</sup> in the assurances EIS provided that size was no longer an aspiration but a challenge: “**It cannot be overstated that we are swamped by available data but they are not being utilized.** They major commitment to data should be integration of existing resources.”<sup>133</sup>

EIS argued that such an agency-wide restructuring, coupled with a large-scale program

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<sup>129</sup>National Research Council and Committee to Review the EPA’s Environmental Monitoring and Assessment Program, *Review of EPA’s Environmental Monitoring and Assessment Program: Overall Evaluation* (Washington, DC: National Academies Press, 1995).

<sup>130</sup>McHarg et al., “A Database Prototype for a National Ecological Inventory,” 2.

<sup>131</sup>*Ibid.*, 2.

<sup>132</sup>Rob Kitchin, *The Data Revolution* (Thousand Oaks, CA: SAGE Publications, 2014); Jeremy W. Crampton et al., “Beyond the Geotag: Situating ‘Big Data’ and Leveraging the Potential of the Geoweb,” *Cartography and Geographic Information Science* 40, no. 2 (2013): 130–39, doi:10.1080/15230406.2013.777137; Matthew Zook et al., “Ten Simple Rules for Responsible Big Data Research,” *PLOS Computational Biology* 13, no. 3 (2017): e1005399, doi:10.1371/journal.pcbi.1005399.

<sup>133</sup>McHarg et al., “A Database Prototype for a National Ecological Inventory,” 7, emphasis in the original.

to facilitate the collection and analysis of environmental data, should not only be a scientific landmark, but a federal effort analogous to the major named outlays of the 20th century: the Marshall Plan, the New Deal, the Tennessee Valley Authority.

We suggest the establishment of a national ecological inventory be seen as the most important act protecting the American environment in history, indispensable for intelligent regulation and management, but moreover, capable of transformings both environmental research and education.<sup>134</sup>

The enormity of the initiative was enabled by rapid advances in geocomputation, which ensures that an “increasing body of digital data is now available for the scientific community and is denoted as Geographic Information Systems.”<sup>135</sup> GIS was both enabler and approach for large-scale environmental inventories. Geographers, for this reason—when listed by name—are primarily those of a computational stripe. Geography had ceased, at least here, to be aspirationally identified with the cultural geography of, for example, Sauer, as it had been when McHarg was interviewed for the Geographers on Film oral history. Rather, Tobler, Goodchild, David Mark... these are the names that emerge when the best of the field is enumerated.

As part of the pilot study, EIS performed a pilot study of Washington Crossing, on the edge of New Jersey and Delaware (see fig. 3.15). This demonstration of a broader approach was meant to demonstrate the availability of spatial data. The report, as far as I can tell, was never published, even internally. It is hard to miss that even this pilot was relatively small-scale and constrained. This demonstrates the degree to which planetary geocomputation

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<sup>134</sup>Ibid., 11.

<sup>135</sup>Ibid., 6.

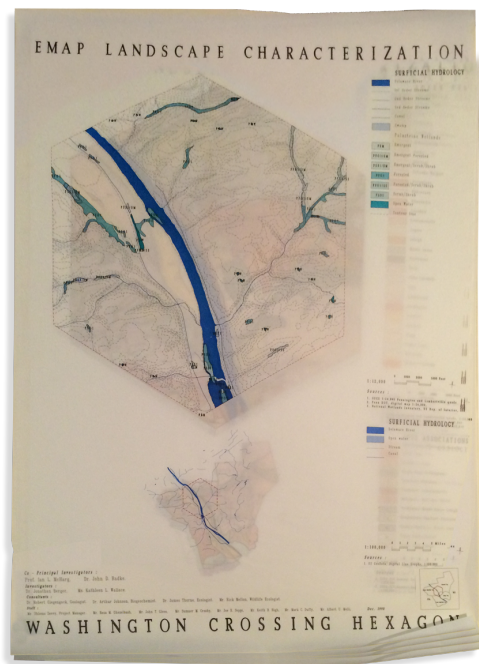
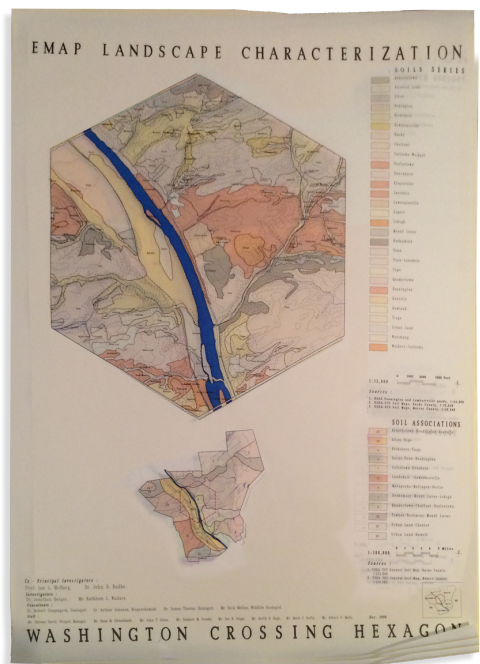
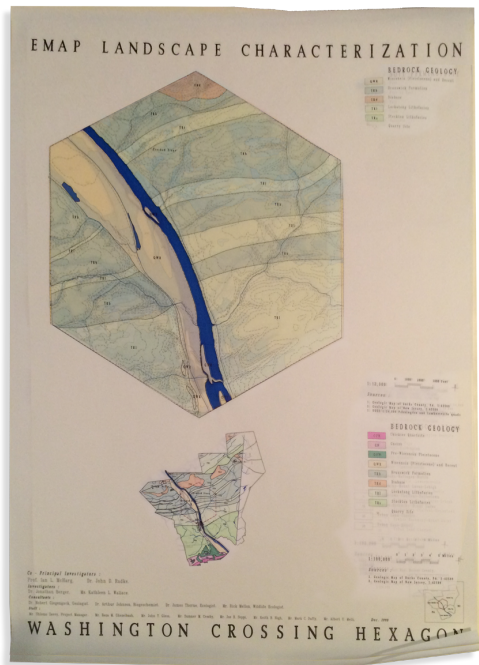
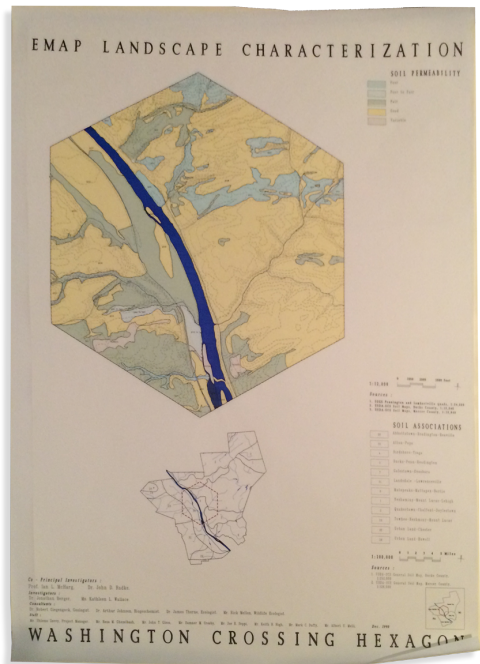


Figure 3.15: Analysis performed by McHarg's firm Expert Information Systems in preparation for the 1992 Database Prototype for a National Ecological Inventory. Image: Eric Robsky Huntley. Original: Architectural Archives, University of Pennsylvania.

remained a dream for McHarg in his own practice. However urgent was the problem of the planet, the globe was not a form of evidence that McHarg ever successfully put into practice.

### 3.10 CONCLUSION

Late September seems to draw me to Kresge Oval for collective experiences of earthly events. Two years prior to the climate strike with which I opened this chapter, I found myself standing in the oval with a large crowd gathered to experience an unusually dark midafternoon. The total eclipse of September 2017 drew crowds giving unusually focused attention to the earth—specifically, its fortuitous position in relation to the sun and the moon. As we shared do-it-yourself eye protection, passing cardboard masks back and forth, the light dimmed for just a few minutes. A planetary event. The earth was standing in the shade of its moon; its relative position became a galvanizing happening for a collective of interested humans. We did all we could to pay attention.

As the light returned, I walked back towards my office. Crossing Massachusetts Avenue, I was yanked back to a different reality. Two signs were hung immediately to the right of the grandiose entrance of MIT's building 7. NASA Lies.org, a Massachusetts-based flat Earth society founded by a figure calling himself Brother Ernest, had set up shop. "Eratosthenes and Pythagoras PROVEN WRONG." "EARTH IS FLAT!" see 3.17 A text-filled sign, decorated with a snake's head, drew a parallel between NASA and the serpent of Eden in partially-translated Hebrew. Bereshis (Genesis) 3:1 was reprinted, selectively translated into English, "Now the Nachash [serpent] is more arum (cunning) than any beast of the sedah [field]." At the top of the sign, Nachash was spelled out in flaming Hebrew characters. At the bottom of an adjoining 'evidence'-filled sign exemplifying Rice's archival magnitude, we are welcomed



*Figure 3.16: Total eclipse from Kresge field, September 2017. Photo by Eric Robsky Huntley.*

to the awakening by “Brother Ernest and the Flat Earth Sister-Wives.”

What struck me here were the divergent potentials of the planetary. The material reality and comforting predictability of orbital motion had produced an earthly event of note that focused the gaze of a large crowd. We were convoked around a dark several minutes guaranteed by the periodic synchrony of three celestial bodies, whose mobility and roundness were preconditions for the event itself. But even as the moon threw shade on the earth, NASA lies.org threw shade on the globe, inviting passersby to a new reality and a counter-enlightenment. I thought immediately of the parallels drawn by numerous scholars between the form of critical thought and the form of conspiratorial thought—Eve Sedgwick’s ‘paranoid reading,’ Felski’s critique-fatigue, Haraway’s nervousness around ‘acid discourse,’





Figure 3.17: Brother Ernest's flat earth advertising its archival magnitude. Photo by Eric Robsky Huntley.

Latour's cheapened suspicion.<sup>136</sup> And I became acutely uncomfortable with the tradition I inherit that distrusts the planetary: as an ideology and as an optic, both of which play at completeness and a view from an impossible vantage.

These two events—the climate march, the eclipse—are conjoined in my memory by their shared location. But they also contain the tense targets at which I'm aiming. We know our planet; we know it intimately. The epistemological winnings of post-enlightenment science are many; who if not 'we'—the scholars, the academics—we are responsible for their care. We know when the planet will be positioned around its moon opposite the sun. This is comfortably predictable. We know that the earth's climate is changing due to very specific causes. This, unfortunately, is also comfortably predictable. In both cases, the question

<sup>136</sup>Sedgwick, "Paranoid Reading and Reparative Reading, or, You're so Paranoid, You Probably Think This Introduction Is About You"; Felski, *The Limits of Critique*; Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective"; Latour, "Why Has Critique Run Out of Steam? From Matters of Fact to Matters of Concern."

arises: given what we know, what do we do? In the case of the eclipse, we gather. We stand in a field together, sharing instruments we have built ourselves, making minor observations and waiting for the lights to dim. We stand and gift our attention to a planetary happening, even as counter-enlightenment theorists stand across the road offering alternative readings of the ‘evidence’. In the case of what we know about the climate, we gather. We process, we march, we raise our voices. We make demands. We draw an hourglass on the globe, tracing the urgency that fills the planetarily-aware and anyone who learns that the earth has quite simply run out of patience. And we do this in spite of those selling alternative readings of the evidence—and I do this in spite of my co-gatherers who hold forth in an absurd faith that simple adjustments to the pricing and incentive structure of extractive capital will drag us back from the edge of ruin.<sup>137</sup>

I think of the sign I see at protests; the one that reads, “do something.” The second-simplest possible statement of an empty imperative (the sign-maker could have saved ink by writing “do”; there would have been no loss of meaning). Facts about the world demand action, but non-specifically. The globe convenes, but can not compel. The planet insists on action, but cannot coerce it. Even those forms of evidence that succeed on epistemic lines leave us stranded as publics make demands.

Which returns us to ‘ought anxiety’. In the last decades of McHarg’s life, environmental threats were coming to take on a valence and a scale more familiar to observers of contemporary ecopolitics. Global warming, sea level rise, climate change... these were in the air and the atmosphere, demanding action. I understand the ‘globe’ as a compelling model for

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<sup>137</sup>Naomi Klein, *This Changes Everything: Capitalism Vs. the Climate* (New York, NY: Simon & Schuster, 2014); John Bellamy Foster, Brett Clark, and Richard York, *The Ecological Rift: Capitalism’s War on the Earth* (New York, NY: Monthly Review Press, 2010); Kate Aronoff et al., *A Planet to Win: Why We Need a Green New Deal* (London, UK: Verso, 2019).

science, and a compelling aesthetic for galvanizing political thought and action at the scale of the problems that roil the contemporary condition. But this cannot be taken to mean that action is withheld until that moment when all things are known about everywhere, even simplistically. Nor can it be taken to mean that action follows directly from the description of the way things are. We are responsible for both our descriptions and our positions. These, while held together by anxious threads, are recalcitrantly non-identical.

*The Discontinuance of Geography at the University of Michigan (1975-1982)*

We ain't got no image. We just haven't. I'm dead serious.

George Kish

At 10:00 AM on 19 June 1981, the Board of Regents of the University of Michigan voted unanimously to discontinue the Department of Geography effective 30 June 1982. This decision marked the close of a grueling public review process by the executive committee of the college of Literature, Science, and the Arts (LS&A) that lasted almost six months. From the mouths of administrators, faculty, and students, images of bodily harm abounded. John Nystuen, the geography department's chair, said after the closure that "the University is attacking its own body in a way that is most disgusting."<sup>2</sup> Vice President for Academic Affairs Billy Frye, discussing the university retrenchment process in general, struggled to predict the precise character of the ensuing pain: "it will hurt ... but I don't know what that really means until I drive the nail into my foot."<sup>3</sup> An undergraduate is quoted in *Michigan Alumnus* magazine, arguing that "amputation is a poor treatment for obesity."<sup>4</sup>

Such grotesque images, read alongside the closure's coincidence with the Reagan revolution, could lead one to think that geography at Michigan was a casualty of austerity and the dawn of neoliberalism at a public institution whose fortunes were highly correlated to the

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<sup>1</sup>The empirical research that forms the basis of this chapter was conducted in collaboration with Matthew Rosenblum. Our respective contributions are detailed in Appendix B.

<sup>2</sup>Andrew Chapman, "Regents Set for Geography Decision," *The Michigan Daily*, June 19, 1981, 13.

<sup>3</sup>Howard Henry Peckham, *The Making of the University of Michigan, 1817-1992*, ed. Margaret L. Steneck and Nicholas H. Steneck (Ann Arbor, MI: University of Michigan Press, 1994), 330.

<sup>4</sup>"Geography Head Rips Procedures," *Michigan Alumnus*, May 1981, 16.

those of the auto industry. Howard Shapiro, after all, then the President of the university, was fond of invoking a rust belt aphorism: “As goes GM, so goes the world.”<sup>5</sup> In parallel, one might be tempted to say that as went G.M., so went the University of Michigan Department of Geography. The Michigan Daily’s above-the-fold composition at the time might lead one to argue the same (see fig. 4.1).

This analysis, however, would fail to answer the question: why was the geography department different than the other departments? Geography’s appeal to the belt-tightener is remarkably consistent. The list of disciplines with a similar record of precarity would be vanishingly short; what other discipline can claim to have seen its presence at Harvard (1948), the University of Pennsylvania (1963), Stanford (1964), Yale (1967), the University of Michigan (1981), the University of Pittsburgh (1983), Columbia (1985), Northwestern (1985), the University of Chicago (1987), and Howard University (1991) not just diminished but formally terminated?<sup>6</sup>

We read the Michigan case as one episode in the de-mattering of geography within the American academy. Rather than spinning more tales of geography’s growth,<sup>7</sup> we instead

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<sup>5</sup>Ivor Peterson, “A Great University Retrenches,” *San Francisco Chronicle*, April 18, 1982, 8.

<sup>6</sup>William A. Koelsch, “Academic Geography, American Style: An Institutional Perspective,” in *Geography: Discipline, Profession and Subject Since 1870*, ed. Gary S. Dunbar, vol. 62, The GeoJournal Library (Dordrecht, Netherlands: Springer, 2001), 245–79.

<sup>7</sup>Which are many, e.g., Trevor J. Barnes, “‘In the Beginning Was Economic Geography’ – a Science Studies Approach to Disciplinary History,” *Progress in Human Geography* 25, no. 4 (2001): 521–44, doi:10.1191/030913201682688922; Vincent Berdoulay, “The Contextual Approach,” in *Geography, Ideology, and Social Concern*, ed. David R. Stoddart (Oxford, UK: Blackwell, 1981), 8–16; Horacio Capel, “Institutionalization of Geography and Strategies of Change,” in *Geography, Ideology, and Social Concern*, ed. David R. Stoddart (Oxford, UK: Blackwell, 1981), 37–69; Gary S. Dunbar, ed., *Geography: Discipline, Profession and Subject Since 1870*, vol. 62, The GeoJournal Library (Dordrecht, Netherlands: Springer, 2001); Ron J. Johnston, “Intellectual Respectability and Disciplinary Transformation? Radical Geography and the Institutionalisation of Geography in the USA Since 1945,” *Environment and Planning A: Economy and Space* 32, no. 6 (2000): 971–90, doi:10.1068/a32191; Ron J. Johnston, “Institutions and Disciplinary Fortunes: Two Moments in the History of UK Geography in the 1960s II: Human Geography and the Social Science Research Council,” *Progress in Human Geography* 28, no. 2 (2004): 187–203, doi:10.1191/0309132504ph480oa; Ron J. Johnston, “Institutions and Disciplinary Fortunes: Two Moments in the History of UK Geography in the 1960s I: Geography in the ‘Plateglass Universities,’” *Progress in Human Geography* 28, no. 1 (2004):

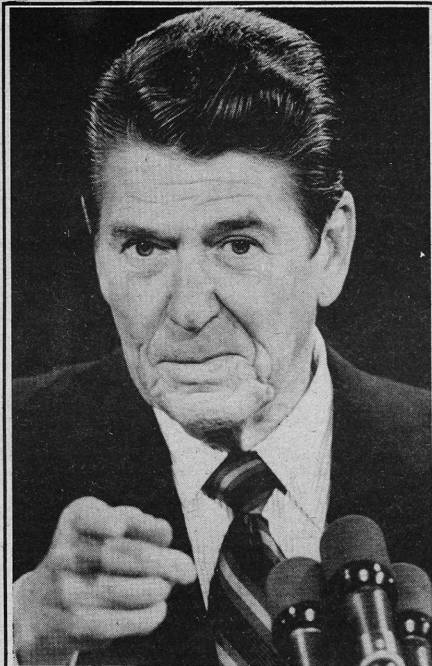
# The Michigan Daily

Vol. XCI, No. 30-5

Ann Arbor, Michigan—Wednesday, June 17, 1981

Ten Cents

Sixteen Pages



*I want you . . .*

. . . to support my tax plan. President Reagan fielded questions on a wide range of issues and tried to garner support for his tax cut plan yesterday in his first televised press conference in more than three months. See story, Page 10.

## U.S. to sell arms to China, Haig announces

From AP and UPI

PEKING—Secretary of State Alexander Haig said last night that the Reagan administration has decided in principle to sell arms to China, and that the United States and China agree on the need to confront Soviet global expansion.

Haig said the deputy chief of staff of China's army, Liu Huaqing, will visit the United States in August to explore specific purchases of arms that can kill, as opposed to those used for military support purposes, such as trucks.

IF A DEAL is struck, it would be the first time the United States has sold arms to China since the communist takeover in 1949.

He told a news conference at the conclusion of his three-day official visit here that the administration

will remove the so-called munitions list restrictions that now prohibit arms sales to China.

Haig met yesterday with Premier Zhao Ziyang and Communist Party Vice Chairman Deng Xiaoping. He said afterward his visit to China was "unusually productive and successful."

HE SAID he told the Chinese that Reagan intends to treat China "as a friendly nation with which the United States is not allied but with which it shares many interests."

Haig dodged specific questions on the degree to which the U.S. relationship with Taiwan was discussed, but he appeared to say it was not a stumbling block. He said he explained the administration's "unofficial relation-

See U.S., Page 10

## Frye urges geography elimination

By ANDREW CHAPMAN  
Daily staff writer

In a long-awaited statement made public yesterday, University Vice-president for Academic Affairs Bill Frye announced he would recommend the discontinuance of the University's Department of Geography to the University Regents.

Frye's recommendation will be presented to the Regents tomorrow at their June meeting. However, a decision from the Regents on discontinuance may not be announced for another month.

REASONS GIVEN by Frye for the proposed elimination were the general economic climate of the University, the "slipping" scholarly quality of the geography department, the department's non-central role in the LSA College, and the large amount of resources that he said would be needed to raise the department to an acceptable standard.

Geography department Chairman John Nystuen said he was not surprised by Frye's recommendation "because the administration did not show a response to arguments made in the department's defense."

LSA Acting Dean John Knott defended Frye's decision. "This is not something we take great pleasure in," Knott said. "There was a necessity for taking this kind of action."

"I BELIEVE the recommendation realizes budgetary realities and the department's failure to compete successfully," Knott said.

Students enrolled in the geography department were distressed by Frye's announcement, although none said they were surprised by the decision.

Ph.D. pre-candidate Victor Santiago said he felt the decision had been made a while ago, and that yesterday's recommendation was just "a question of rubber-stamping it."

DOCTORAL candidate Margaret Wilder criticized Frye's open hearings held over the past two weeks, in which students and faculty members were encouraged to provide suggestions and criticism. Wilder said she believed Frye's hearings had "little or no impact on his decision."

However, Frye said that the talks he held with members of the University community were "significant," and that "had the interviews provided different input the report could have been modified, delayed, or withdrawn."

University President Harold Shapiro said the open hearings "helped articulate various options."

See GEOGRAPHY, Page 9



Frye

. . . not just administration vs. faculty

## AAUP profs question geography decision

By ANDREW CHAPMAN  
Daily staff writer

Representatives of the American Association of University Professors will go before the Regents tomorrow, claiming that the administration ignored an essential Regental bylaw in its review of the geography department.

The professors will argue that if the bylaw was violated, as they believe it was, the administration's recommendation to discontinue the geography department is invalid.

ACCORDING TO the AAUP representatives, the Regents' bylaws leave such questions as program discontinuance with the faculty—not with the administration.

Former president of the AAUP, and University mathematics professor, Wilfred Kaplan said "we are arguing that the administration's procedure was inconsistent

See AAUP, Page 5

Figure 4.1: Michigan's discontinuance coincided with the dawn of the Reagan revolution in the American polity and the rusting of the rust belt. Printed in The Michigan Daily, June 17, 1981.

focus on its erosion in American institutions of higher education, asking after the multiple causes of its acute moments of failure. As many have argued, much can be gained by taking “erosion, breakdown and decay, rather than novelty, growth, and progress, as our starting points.”<sup>8</sup> As Jackson, as well as Mattern<sup>9</sup> and Graham<sup>10</sup> emphasize, focusing on breakdown allows the researcher to see the habitual acts of maintenance that sustain the appearance of stability, as well as the fissures that become chasms in time. For this reason, we suggest a ‘breakdown historiography’ for the history of geography, beginning at Michigan.

We frame our narrative reconstruction with reference to two prominent studies of departmental discontinuance: namely, Neil Smith’s well-known discussion of geography’s demise at Harvard,<sup>11</sup> as well as Lahiri-Dutt’s study of its discontinuance at the Australian National University.<sup>12</sup> We then briefly discuss the several appearances of the Michigan closure in extant histories of the discipline. We then construct a narrative account of the events surrounding the discontinuance. Our reconstruction of this history is based on archival research conducted at Michigan’s Bentley Historical Library, two folios of documents related to the discontinuance given to us by John Nystuen, and oral-historical interviews with Michigan faculty emeritus Ann Evans Larimore and Nystuen. I detail my methods more exhaustively

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57–77, doi:10.1191/0309132504ph470oa; Ron J. Johnston, “Changing a Discipline in Universities and a Subject in Schools: British Geography in the 1950s–1970s,” *History of Education* 48, no. 5 (2019): 682–99, doi:10.1080/0046760X.2019.1584650; Koelsch, “Academic Geography, American Style: An Institutional Perspective”; Livingstone, *The Geographical Tradition: Episodes in the History of a Contested Enterprise*; Janice Monk, “Women, Gender, and the Histories of American Geography,” *Annals of the Association of American Geographers* 94, no. 1 (2004): 1–22, doi:10.1111/j.1467-8306.2004.09401001.x; Schulten, *The Geographical Imagination in America, 1880-1950*.

<sup>8</sup>Steven J. Jackson, “Rethinking Repair,” in *Media Technologies*, ed. Tarleton Gillespie, Pablo J. Boczkowski, and Kirsten A. Foot (Cambridge, MA: The MIT Press, 2014), 221, doi:10.7551/mitpress/9780262525374.003.0011.

<sup>9</sup>“Maintenance and Care,” *Places Journal*, November 20, 2018, doi:10.22269/181120.

<sup>10</sup>*Disrupted Cities: When Infrastructure Fails* (New York, NY: Routledge, 2009).

<sup>11</sup>“Academic War over the Field of Geography’: The Elimination of Geography at Harvard, 1947–1951.”

<sup>12</sup>“Academic War’ over Geography? Death of Human Geography at the Australian National University,” *Antipode* 51, no. 3 (2019): 858–77, doi:10.1111/anti.12496.

in Appendix A. We conclude with summary remarks that outline the rationale for and necessity of historical scholarship on geography's institutional precarity, and briefly discuss how such histories might proceed.

#### 4.1 HISTORIES OF DISCONTINUANCE

While histories of geography are not silent on the closure of academic departments, such episodes are often treated as anomalies in the story of geography's growth and development.<sup>13</sup> This scholarship is furthermore often limited to Ivy League institutions,<sup>14</sup> including Columbia,<sup>15</sup> Yale,<sup>16</sup> and—especially—Harvard, following the work of Neil Smith.<sup>17</sup> This is to our detriment. Harvard Yard offers an odd vantage point from which to examine the discipline's vulnerability. It was not not the Ivies and private elites that saw geography flourish, but public universities.<sup>18</sup> Higher education in the United States is highly heterogeneous<sup>19</sup>

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<sup>13</sup>Michael S. DeVivo, *Leadership in American Academic Geography: The Twentieth Century* (Lanham, MD: Lexington Books, 2015); L. Dee Fink, "The Changing Location of Academic Geographers in the United States," *The Professional Geographer* 31, no. 2 (1979): 217–26, doi:10.1111/j.0033-0124.1979.00217.x; Alexander B. Murphy, "Geography's Place in Higher Education in the United States," *Journal of Geography in Higher Education* 31, no. 1 (2007): 121–41, doi:10.1080/03098260601033068.

<sup>14</sup>Richard Wright and Natalie Koch, "Geography in the Ivy League," in *International Encyclopedia of Human Geography*, ed. Rob Kitchin and Nigel Thrift, vol. 5 (Oxford, UK: Elsevier, 2009), 616–22.

<sup>15</sup>Karen Debres, "Political Geographers of the Past IV George Renner and the Great Map Scandal of 1942," *Political Geography Quarterly* 5, no. 4 (1986): 385–94, doi:10.1016/0260-9827(86)90025-X.

<sup>16</sup>"A Law and Geography Perspective on the New Haven School," *Yale Journal of International Law*, no. 2 (2007): 421–54, <https://papers.ssrn.com/abstract=976810>.

<sup>17</sup>John P. Augelli and Donald J. Patton, "On 'Academic War over the Field of Geography,'" *Annals of the Association of American Geographers* 78, no. 1 (1988): 145–47, doi:10.1111/j.1467-8306.1988.tb00197.x; Andrew F. Burghardt, "On 'Academic War over the Field of Geography,' the Elimination of Geography at Harvard, 1947–1951," *Annals of the Association of American Geographers* 78, no. 1 (1988): 144–44, doi:10.1111/j.1467-8306.1988.tb00196.x; Saul B. Cohen, "Reflections on the Elimination of Geography at Harvard, 1947–51," *Annals of the Association of American Geographers* 78, no. 1 (1988): 148–51, doi:10.1111/j.1467-8306.1988.tb00198.x; Glick, "Before the Revolution: Edward Ullman and the Crisis of Geography at Harvard"; Geoffrey J. Martin, "On Whittlesey, Bowman and Harvard," *Annals of the Association of American Geographers* 78, no. 1 (1988): 152–58, doi:10.1111/j.1467-8306.1988.tb00199.x; Smith, "Academic War over the Field of Geography": The Elimination of Geography at Harvard, 1947–1951."

<sup>18</sup>Schulten, *The Geographical Imagination in America, 1880-1950*.

<sup>19</sup>Susan M. Roberts, "Realizing Critical Geographies of the University," *Antipode* 32, no. 3 (2000): 230, doi:10.1111/1467-8330.00132.



and institutional contexts vary widely.<sup>20</sup> For at least these reasons, we would suggest the University of Michigan department is more representative than the storied Harvard case.

Nevertheless, Smith's<sup>21</sup> work on Harvard is groundbreaking; we are especially drawn to his insistence that *both* the particular and the general matter in the case of Harvard's closure. While Smith's purpose is partially to assemble a more accurate account of events and the roles of specific actors, it is also to situate the events in Cambridge in a larger history of geography's precarity. Smith accomplishes the latter with reference to what Reynaud called the "myth of the unity of geography", or the 'unity myth'. Reynaud, an American-born French geomorphologist, outlines this fantastical story of disciplinary scope in his *La géographie entre le mythe et la science*.<sup>22</sup> In coining this phrase, Reynaud referred to the notion that geography is inclusive of all knowledges that come into contact with the surface of the earth. Smith, following Glick,<sup>23</sup> argues that the unity myth makes it difficult to argue for the necessity of a freestanding geography department, a concern which appears repeatedly in the Michigan case. We share Smith's aspiration; to understand the Michigan closure as 'overdetermined' while also holding fast to the idea that a recognition of contingency does not invalidate broader concerns about geography's self-defense. We note that even Althusser, in pursuit of a theory of plural causes and overdetermination, did not deny the existence of causal arrow with priority.<sup>24</sup> [^We are grateful to a reviewer for bringing this to our attention.] If geography's position was fragile at Harvard (and, as we demonstrate, at Michigan), it also tends to be fragile elsewhere, suggesting that our histories must move

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<sup>20</sup>Osofsky, "A Law and Geography Perspective on the New Haven School."

<sup>21</sup>"Academic War over the Field of Geography': The Elimination of Geography at Harvard, 1947-1951."

<sup>22</sup>*Geography between myth and science, La Géographie Entre Le Mythe et La Science: Essai d'epistémologie (Geography Between Myth and Science: An Essay on Epistemology).*

<sup>23</sup>"In Search of Geography."

<sup>24</sup>Louis Althusser, *For Marx*, trans. Ben Brewster (1965; repr., New York, NY: Verso, 2006).

beyond the Crimson chip on our shoulder, examining both the contextual richness of local histories and the common difficulties that face a discipline that defends itself as a 'bridge' between others.

Indeed, recent histories by geographers touching on the closure and diminishment of geography departments outside of the United States demonstrate the necessity of such a position.<sup>25</sup> Lahiri-Dutt's<sup>26</sup> essay on the elimination of geography at the Australian National University, for example, concludes with a recommendation regarding how to respond to threats. She argues that "we know that geography is more than one singular body of knowledge; it is at once a discipline and a disciplinary bridge that translates place and space into languages and meanings that are significant to scholars trained in other epistemologies" (15). We are heartened to see empirical work on discontinuance; however, our findings at Michigan suggest that precisely the department's adherence to the 'unity myth' had catastrophic effects. Making sense of our discipline's institutional precarity requires historical scholarship that documents the cases (and causes) of the closures that litter our past: both those causes that are contingent, and those that place Michigan amongst other geography departments struggling to articulate the discipline's difference.

The Michigan discontinuance is not entirely absent from literature on the history of academic geography, but it only appears in passing. The written accounts of several geographers adjacent to the affair are worth quoting at length. In an essay reflecting on the legacy

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<sup>25</sup>Wun Fung Chan, "Mourning Geography: A Punctum, Strathclyde and the Death of a Subject," *Scottish Geographical Journal* 127, no. 4 (2011): 255–66, doi:10.1080/14702541.2011.636750; Lily Kong, "Geography's Place in Higher Education in Singapore," *Journal of Geography in Higher Education* 31, no. 1 (2007): 39–56, doi:10.1080/03098260601032987; James D. Sidaway and Ron J. Johnston, "Geography in Higher Education in the UK," *Journal of Geography in Higher Education* 31, no. 1 (2007): 57–80, doi:10.1080/03098260601033027; Lahiri-Dutt, "Academic War' over Geography? Death of Human Geography at the Australian National University"; Emma Wainwright et al., "Geographers Out of Place: Institutions, (Inter)disciplinarity and Identity," *Area* 46, no. 4 (2014): 410–17, doi:10.1111/area.12126.

<sup>26</sup>"Academic War' over Geography? Death of Human Geography at the Australian National University."

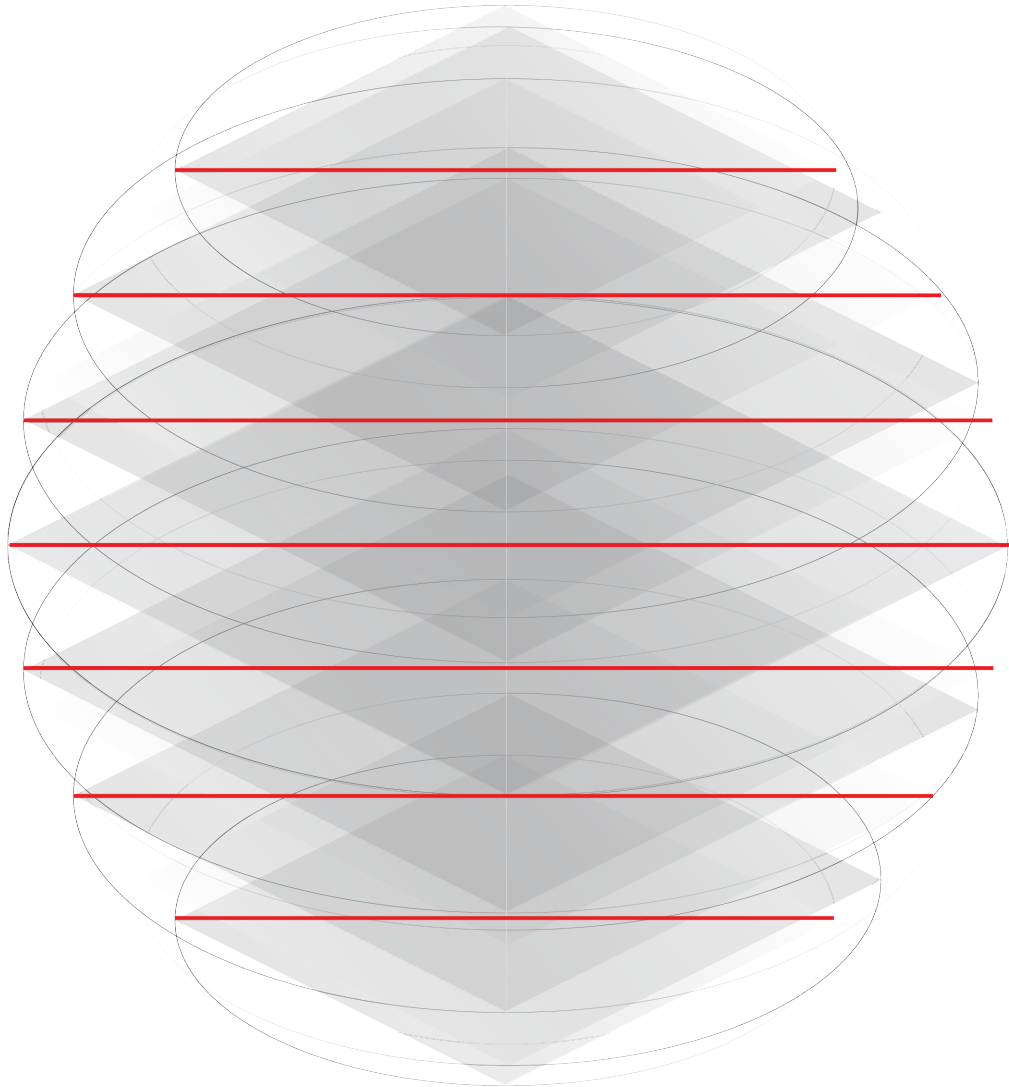
of former Michigan faculty Gunnar Olsson, his student Michael Watts blames the closure on administrative timidity in the face of political-economic disturbances. The culprits, for Watts, are “the collapse of the Detroit economy, the utter failure of leadership and governance from the Department itself, the petty-minded hostility of the university accountants and administrators who neither understood the discipline nor what a university represented, and the spinelessness of the academic senate who felt that uncomfortable sacrifices would prevent further rot.”<sup>27</sup> Waldo Tobler, who was the department’s foremost researcher until he decamped for Santa Barbara in 1977, enumerated a series of very specific causes:

Several of the faculty had affiliations with area centers or other units and were thus de facto only part-time members of the department. Three senior geographers—Gunnar Olsson, Melvin Marcus [sic, see below], and I—left at the same time, and the department was able to replace these positions only with nontenured assistant professors, a mistake that weakened the department. Few of the faculty served on campuswide committees, another weak point. From my service on the Dean’s Promotion and Tenure Committee, I was aware that a historian on that committee was antagonistic toward geography, arguing that Harvard did not have a geography department, so Michigan did not need one. All these factors, combined with a financial crunch in the state of Michigan, led to the closing of the department.<sup>28</sup>

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<sup>27</sup>Michael Watts, “Of Bats, Birds, and Mice...,” in *GO: On the Geographies of Gunnar Olsson*, by Christian Abrahamsson and Martin Gren (Surrey, UK: Ashgate, 2012), 152–53.

<sup>28</sup>Waldo Tobler, “Ma Vie,” in *Geographical Voices: Fourteen Autobiographical Essays*, ed. Peter Gould and Forrest R. Pitts (Syracuse, NY: Syracuse University Press, 2002), 139.



*Figure 4.2: A bridge is a gap-spanning discipline, the geographer sitting suspended between two sides of a disciplinary chasm. Graphic by Eric Robsky Huntley.*

Thomas Glick, a trained historian and professor of geography at Boston University, wrote contemporaneously from an angle more concerned with Smith's 'broader history.' Glick pointed out the continuity between the questions raised by the Michigan review committee and the anxieties that chronically plague geographic inquiry.

The committee which recommended the termination of the University of Michigan's geography program concluded that the department, in failing to bridge the gap between the physical and human sciences, had disappointed one of the principal rationales (faithful to the unity myth) for its continued existence. ... The Michigan case underscores the necessity for facing the unity myth head on.<sup>29</sup>

More recent accounts tend to abandon the institutional detail of contemporary and participant accounts and read the discontinuance into familiar narratives. Barnes, for example, asserts in passing, that "[closures at Michigan and Chicago] occurred directly from the closure of geography at Harvard in 1948," and that they were the "result of key faculty who practiced spatial science leaving Chicago and Michigan for elsewhere."<sup>30</sup> To assert that Michigan follows directly from Harvard is to identify a reality, but also to overstate the case. While the absence of geography at Harvard was invoked during the course of the Michigan proceedings (see Tobler's remarks above), the argument was not determinative in the absence of other causes. And while both Waldo Tobler and Gunnar Olsson did, indeed, depart in 1977, Tobler's loss was analyzed by administrators primarily in terms of lost research productivity,

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<sup>29</sup>Glick, "In Search of Geography," 97.

<sup>30</sup>"A Short Cultural History of Anglo-American Economic Geography: Bodies, Books, Machines, and Places," in *Encounters and Engagements Between Economic and Cultural Geography*, ed. Barney Warf, vol. 104 (Dordrecht, Netherlands: Springer, 2012), 34.

not lost epistemic validity. Furthermore, Olsson's departure was seen as shedding a source of friction, not, pace Barnes, as the dimming of a 'truth spot'. (We discuss these departures in greater detail below.)

In contrast to Barnes's historicist inclinations, DeVivo<sup>31</sup> blames the individual leadership of the Michigan department's chairs. He argues that the program "was characterized by lackluster leadership" and furthermore that...

...the climate of the department, marked by the acceptance of *laissez faire* leadership attributes, which were established early in its history, would present far-reaching ramifications for the future of geography at Michigan (39).

DeVivo further pursues this point by dubiously asserting a parallel between closures at Michigan and Harvard, arguing that "Harvard's demise largely came as a result of Whittlesey's *laissez faire* leadership[,]" and "there is not real evidence to indicate that in Ann Arbor a similar situation did not occur" (169). Unfortunately, there is evidence. There is evidence that the Harvard case had quite a lot to do with both the nature of the discipline and an internecine conflict that was bound up with mid-century homophobia, neither of which can be collapsed into broad generalizations about leadership styles.<sup>32</sup> There is also evidence that the collapse of geography at Michigan had less to do with leadership than with the apparent coherence of the discipline, the changing economy of higher education, the auto industry in the American Midwest, and highly contextual points of institutional strategy. We are therefore compelled to disagree with DeVivo's analysis for at least those reasons given by

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<sup>31</sup>*Leadership in American Academic Geography: The Twentieth Century.*

<sup>32</sup>Smith, "Academic War over the Field of Geography': The Elimination of Geography at Harvard, 1947–1951."

Johnston.<sup>33</sup>

However, our aim is not to adjudicate between these narratives. Instead, in turning to the story of Michigan, we take them seriously, which means locating alignments between inherited stories and historical events, as well as divergences and even surprises.

#### 4.2 FIGURING DISCONTINUANCE: UNITY, DONUTS AND BRIDGES

We note the our inherited stories—including those of what is central to geography—are often given explicit aesthetic-topological shapes. Peck and Olds articulate this facet of our identity crisis by way of an culinary metaphor, figuring economic geography as a donut with a characteristic hole: a ‘negative identity’ which we are told animated conversation at the University of Wisconsin-Madison’s Summer Institute in Economic Geography<sup>34</sup>

Peck and Olds connect the hollowing out of the donut explicitly to a historiographic art of forgetting. “The limited recall of past episodes in the evolution of economic geography means that pejorative reconstructions of the discipline’s history may go unchallenged... while lessons of the past may take a caricatured form or fade from the memory all together.”<sup>35</sup> Keighren et al. echo the same point for geography in general, arguing that geographers have a rather narrow way of reading our disciplinary past.<sup>36</sup> They suggest that they demarcate a limited range of “good” precedents from “bad” disciplinary work, building our scholarly contributions on thin foundations while snarling at other traditions—which is of course not

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<sup>33</sup>Ron J. Johnston, “Leadership in American Academic Geography: The Twentieth Century Michael S. DeVivo. Lexington Books, Lanham, 2015, Pp. Xiv + 211 (ISBN 978-0-7391-9912-1) (Hbk).: Book Review,” *Singapore Journal of Tropical Geography* 37, no. 2 (2016): 269–71, doi:10.1111/sjtg.12144.

<sup>34</sup>Jamie Peck and Kris Olds, “Report: The Summer Institute in Economic Geography,” *Economic Geography* 83, no. 3 (2009): 309–18, doi:10.1111/j.1944-8287.2007.tb00356.x.

<sup>35</sup>*Ibid.*, 318.

<sup>36</sup>Innes M. Keighren, Christian Abrahamsson, and Veronica della Dora, “On Canonical Geographies,” *Dialogues in Human Geography* 2, no. 3 (2012): 296–312, doi:10.1177/2043820612468534.

to say that many of these traditions are not colonialist, masculinist, and racist.<sup>37</sup> Furthermore, it would be misleading to suggest that other social-scientific disciplines are characterized by constructive cohesion around a central object. However, Keighren, alongside a range of other recent writers, suggest that geography is perhaps unique in its steadfast refusal to avail itself of historical-theoretical resources.<sup>38</sup>

We are not nostalgic for an imagined heyday, not least of all because there is no era preceding geography's promiscuity. Kwan notes that geography has always been characterized by its pluralism, and that "attempts to create a unified identity for geography based on a singular and purified vision seem to be untenable projects."<sup>39</sup> Agnew makes a similar point, arguing that the discipline "has never had much intellectual unity."<sup>40</sup> Peck and Olds argue that we ought not waste time dreaming of new 'monism,' even if we ought to locate an axis along which to orchestrate a 'collective endeavor.'<sup>41</sup> Furthermore, geographers have ably demonstrated that centrality and disciplinary boundary-making are always exercises of discursive power. As Cockayne et al. remind us, the question of what is central to a discipline has a way of raising the question of who articulates the terms on which the center is articulated.<sup>42</sup> The scholarship we tend to center in our discourse has a way of doing maintenance

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<sup>37</sup>Barnes, "Geography's Underworld: The Military-Industrial Complex, Mathematical Modelling and the Quantitative Revolution"; Rose, "Distance, Surface, Elsewhere"; Wainwright et al., "Geographers Out of Place: Institutions, (Inter)disciplinarity and Identity."

<sup>38</sup>Keighren, Abrahamsson, and della Dora, "On Canonical Geographies"; Richard C. Powell, "Echoes of the New Geography? History and Philosophy of Geography I," *Progress in Human Geography* 36, no. 4 (2012): 518–26, doi:10.1177/0309132511411880; Sheppard, "We Have Never Been Positivist"; David O'Sullivan, Luke Bergmann, and Jim E. Thatcher, "Spatiality, Maps, and Mathematics in Critical Human Geography: Toward a Repetition with Difference," *The Professional Geographer* 70, no. 1 (2018): 129–39, doi:10.1080/00330124.2017.1326081.

<sup>39</sup>Mei-Po Kwan, "Beyond Difference: From Canonical Geography to Hybrid Geographies," *Annals of the Association of American Geographers* 94, no. 4 (2004): 757, doi:10.1111/j.1467-8306.2004.00432.x.

<sup>40</sup>John Agnew, "Of Canons and Fanons," *Dialogues in Human Geography* 2, no. 3 (2012): 322, doi:10.1177/2043820612468547.

<sup>41</sup>Peck and Olds, "Report: The Summer Institute in Economic Geography."

<sup>42</sup>Cockayne et al., "On Economic Geography's 'Movers' to Business and Management Schools: A Response from Outside 'the Project.'"



work, article by article, citation by citation, on an exclusionary center.<sup>43</sup>

To speak in terms of absent centers, though, is somewhat misleading. It's not so much that geography has never had a consistent language for articulating its value. I identify this language, and the aesthetic for the conjoining of disciplinary knowledges it implies, the 'bridge': a form of evidence in which knowledge drawn from two sides of a chasm is stitched together by a discipline equipped to span the gap. To take the lessons of the Michigan discontinuance seriously is to reach the conclusion that the 'unity myth' is not precisely to blame for the discipline's difficulty, and nor is the 'donut'—it is neither that geography's object is all things, nor that geography's center is absent. It is that geography has placed itself, discursively, between and betwixt natural scientific and social scientific knowledge makers.

It is notable that in their well-read article on "engaged pluralism" in economic geography, Barnes and Sheppard (2010) are drawing on Bernstein's "Pragmatism, Pluralism, and the Healing of Wounds". In this piece, Bernstein notes that "the achievement of a 'we' is a fragile and contemporary achievement that can always be ruptured" (Bernstein 1989). Debates around centrality and power, as we will demonstrate in the case of Michigan, must also be accompanied by an institutional pragmatics concerned with the difficulty and animated by the necessity of achieving a "we" across difference. It is the fragility of achieving 'we' *across* evidentiary forms figured as separable. We explore the substantial divergence between this aesthetic ideal for geographic evidence and the actual practice of geography-making in the University of Michigan's department. Furthermore, we point to identify this divergence as essential to understanding the administration's dismissal of geography from the University.

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<sup>43</sup>Carrie Mott and Daniel Cockayne, "Citation Matters: Mobilizing the Politics of Citation Toward a Practice of 'Conscientious Engagement,'" *Gender, Place & Culture* 24, no. 7 (2017): 954–73, doi:10.1080/0966369X.2017.1339022.

#### 4.3 'THE OMEGA AFFAIR'

On 25 January 1981, chair of the geography department John Nystuen was summoned to the office of Associate Dean Bob Holbrook under the pretense of a conversation about changes in departmental funding. On arrival, Holbrook informed Nystuen that Dean of LS&A John Knott wanted to be in on the meeting, walking the chairperson to the Dean's office. The promised discussion of departmental funding took place, but with an edge rather more existential than anticipated. Knott informed Nystuen that the college was initiating proceedings that would review the department for possible discontinuance. Despite the chair's protests, the deed was done; the University Vice President for Academic Affairs John Frye had already approved the decision and delivered an announcement to the University's Information Services department. The news would be public in a matter of hours. When Nystuen returned to his office, he found a letter addressed to all LS&A chairs informing them of the discontinuance proceedings.<sup>44</sup>

Professor George Kish recalls the shock of the day several months later:

At 10 o'clock on January 27 [sic], 1981, I went to meet a class. At 11 o'clock, I was met by my chairman, who at that time had just returned from the office of the dean to be informed that discontinuance proceedings were established, instituted against the department. We found out after the news, the radio, and the television heard it. I think the best reaction was from the son of our first chairman ... who called me that night and said he was out on a field trip with students. He had his radio in his car, he heard it, and he barely avoided the

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<sup>44</sup>Don Hunt, "How the Cuts Were Made," *Ann Arbor Observer*, September 1981.

ditch. It was incredible.<sup>45</sup>

When asked by the *Michigan Daily* why the announcement of discontinuance proceedings astonished him, Kish replied: “because we are a department that has had an existence since 1915 in connection with geology and since 1923 as an independent department. That’s a very long time. That’s first. Second, because in the 41 years I’ve been a member of the faculty, I know of only one instance when a department was discontinued. That was in the public health school.”<sup>46</sup> He refers to the closure of the Population Planning Department, which in 1977 had occasioned the creation of formal University procedures for initiating departmental discontinuances.<sup>47</sup> He also argues that the department might count on the protection of “the department’s standing nationally,” as “one of the top 10 among over 150—or close to 200—departments in the United States and Canada.”<sup>48</sup> Finally, he argues—maybe most implausibly—that “geography as an independent department is an established fact of university life all over the world and in North America”<sup>49</sup> and that geography cannot be dissolved because it is a “discipline as old as any—going back to the days of Alexander in the Third Century B.C. It has had an independent existence. It does not lend itself to absorption particularly well.”<sup>50</sup> Nystuen did not share Kish’s optimism. “We can’t get rid of chemistry or history, those are central to the college,” he said. “We will have a hard time convincing

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<sup>45</sup>George Kish, “We Ain’t Got No Image,” in *Annual Meeting of the East Lakes Division of the Association of American Geographers* (Bowling Green, OH, 1981), n.p.

<sup>46</sup>Mark Parrent, “After 41 Years of Teaching, Prof ‘Astonished’ by Geography Review,” *The Michigan Daily*, January 27, 1981, 1.

<sup>47</sup>Gerlinda S. Melchiori, “Smaller and Better: The University of Michigan Experience,” *Research in Higher Education* 16, no. 1 (1982): 55–69, doi:10.1007/BF00992049; Peckham, *The Making of the University of Michigan, 1817-1992*.

<sup>48</sup>Parrent, “After 41 Years of Teaching, Prof ‘Astonished’ by Geography Review,” 1.

<sup>49</sup>Ibid., 1.

<sup>50</sup>Ibid., 2.

our colleagues that we are central.”<sup>51</sup>

Students of the department and alumni expressed concern and outrage as well, making arguments in terms of disciplinary identity. Gunther Volk, an alumnus of the department’s M.A. program, asked in the *Daily*: “is there something inherent in the make-up of this discipline that dooms it to extinction? Looking at the field of geography today, the casual observer is overwhelmed by a bewildering hodge-podge of sub-disciplines that bear as much resemblance to the geography of Herodotus ... as a bull-drawn cart bears to a Cadillac.”<sup>52</sup> James Akerman and John Oppenheim, graduate students in the department, write in the *Daily* that they “wonder if the administration really understands what modern geographers are academically involved in at Michigan,” or the discipline’s “long academic tradition.” They are pessimistic, recognizing that “the decision to initiate discontinuance proceedings seems pre-planned and biased in favor of the administration’s position.”<sup>53</sup>

It is true that even at this early date, there was reason to believe that the department’s chances of survival were slim. A cartoon submitted by graduate students to the *Michigan Daily* was right to suggest that by the time administrators took their seats around the table, the geography department was already carved for consumption (see fig. 4.3). Questioning the merits of a department’s continuation in public does immediate reputational damage. A department operating under the cloud of discontinuance proceedings is a department whose ability to hire new faculty, recruit graduate students, and secure support from its institution is crippled. John Knott admits as much to John Nystuen in a letter: “opening the case was

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<sup>51</sup>Lorenzo Benet, “Geography Department Slated for Elimination Pending Special Review,” *The Michigan Daily*, January 27, 1981, 7.

<sup>52</sup>Gunther Volk, “Specialization Doomed Geography,” *The Michigan Daily*, January 29, 1981, 4.

<sup>53</sup>James Akerman and John Oppenheim, “U: Think Before You Cut,” *The Michigan Daily*, February 8, 1981.

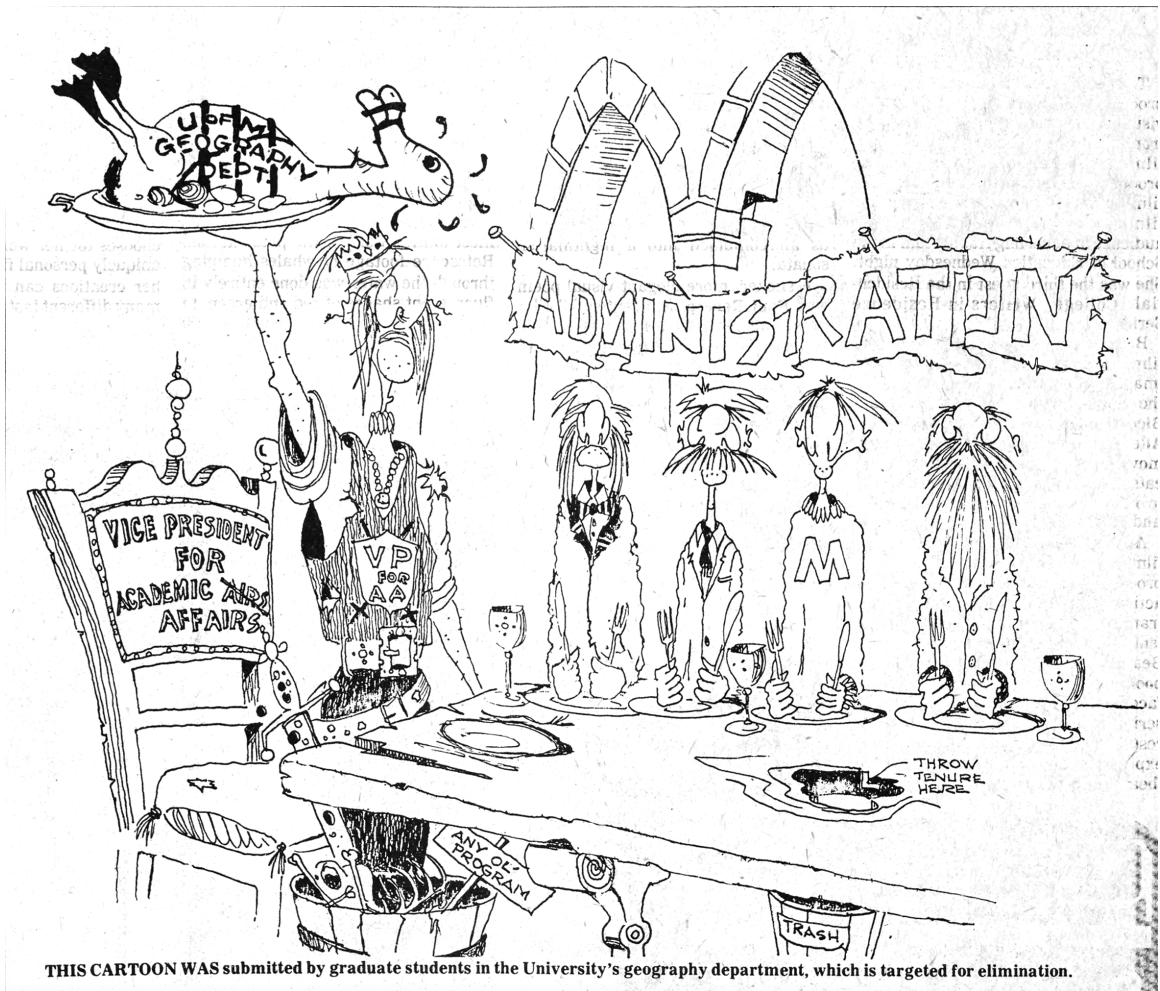


Figure 4.3: Cartoon submitted by graduate students in the Department of Geography to the Michigan Daily, printed February 14, 1981.

not a neutral action. It would be a mistake for me to pretend that it was. We have reached a tentative conclusion and have put it forward to be tested.”<sup>54</sup>

In fact, the LS&A Executive Committee had already voted in private and unanimously that the geography department should be put forward for discontinuance.<sup>55</sup> In August 1980, Eric Rabkin, Associate Dean of Long-Range Planning, had presented the Executive Committee with a description of an anonymized department, dubbed ‘Department Omega.’ This

<sup>54</sup>John R. Knott to John D. Nystuen, February 6, 1981, “The Grey Book” (presentation to Regents), Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

<sup>55</sup>Peckham, *The Making of the University of Michigan, 1817-1992*.

was the geography department, anonymized and modified. It was widely recognized that faculty across the University would resist attempts to discontinue entire academic units; in 1977, the University had discontinued the Department of Population Planning in the School of Public Health, causing an uproar and creating a certain degree of trepidation among administrators.<sup>56</sup> As such, Knott and Rabkin sent up an anonymized test balloon before identifying a department by name: Department Omega's enrollments and measures of faculty productivity were higher than those of geography, effectively testing a slightly higher-performing department before submitting the geography department for discontinuance. While we can find no non-speculative evidence, it is reasonable to think that the name was chosen for its associations with finality and conclusions ('Alpha and...').

The identity of 'Department Omega' was revealed to the Executive Committee privately in December. On 8 January 1981, almost three weeks before members of the department were notified, the LS&A Executive Committee—who would be responsible for evaluating the results of the discontinuance review—came to the unanimous conclusion that if any department was to have its future very publicly called into question it would be geography.<sup>57</sup> John Nystuen was not far off the mark when he claimed that the department would ultimately be “judged by [its'] accusers.”<sup>58</sup> After these deliberations became public, those sympathetic to the faculty took the title 'Omega' as an honorific, referring to the entire proceedings as “the Omega Affair.”<sup>59</sup> Self-identifying 'survivors' of the affair referred to themselves as the 'Omega Society.'<sup>60</sup>

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<sup>56</sup> Ann Larimore, interview by Eric Robsky Huntley and Matthew Rosenblum, December 14, 2016; Melchiori, “Smaller and Better: The University of Michigan Experience.”

<sup>57</sup> Hunt, “How the Cuts Were Made.”

<sup>58</sup> Kathy Hulik, “Backers Urge U-M to Spare Geography,” *The Ann Arbor News*, June 8, 1981, A-7.

<sup>59</sup> John D. Nystuen, interview by Eric Robsky Huntley and Matthew Rosenblum, December 16, 2016.

<sup>60</sup> Bob Rice, “Economical Invitation,” *The Michigan Daily*, January 27, 1982.

#### 4.4 AUSTERITY ARRIVES

These administrative machinations were responses to catastrophic disruptions in the domestic auto industry, the political economy of higher education, in general, and of public institutions in Michigan, in particular (fig. 4.4). The University of Michigan had begun experimenting with active retrenchment in 1970. Following a budget shortfall at the state level, a one-percent cut to state appropriations was passed down after the annual budget was already approved. This was followed by a three-percent cut in 1971-1972. Conditions did not improve the following year: state appropriations fell \$11 million short of expectations, on top of another two-percent retroactive cut in 1973-1974. In that same year, geopolitics conspired to worsen the fiscal outlook in Michigan: OPEC imposed an embargo on nations that had supported Israel during the the Yom Kippur/Ramadan War, driving domestic energy prices up and domestic auto sales down, eroding the Michigan tax base even as the University's energy costs rose dramatically.<sup>61</sup>

Shocks continued throughout the late 1970s into the early 1980s. In January 1979, a coalition of leftist and Islamist forces in Iran overthrew the Shah.<sup>62</sup> The Ayatollah Khomeini quickly moved to cut Iran's oil production, sending energy prices skyward. Domestic auto sales, already diminished by the energy crises of the previous decade, were decimated. The domestic auto industry, on which the State of Michigan relied for tax revenue, imploded. Chrysler workers were forced to make concessions amounting to \$1.1 billion; 200,000 auto workers were fired or laid off in 1980. Ford closed 9 factories between 1980 and 1982 and cut production by 1 million units. Sales of Ford vehicles dropped 47 percent between 1978

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<sup>61</sup>Meg Jacobs, *Panic at the Pump: The Energy Crisis and the Transformation of American Politics in the 1970s* (New York, NY: Hill & Wang, 2017); Peckham, *The Making of the University of Michigan, 1817-1992*.

<sup>62</sup>Charles Kurzman, *The Unthinkable Revolution in Iran* (Cambridge, MA: Harvard University Press, 2005).

and 1982, shedding 46 percent of its hourly labor force (affecting 100,000 workers) over the same period. Between 1980 and 1981, G.M. alone laid off 200,000 workers.<sup>63</sup> Alongside the contraction in the domestic auto market, the United States Federal Reserve (‘the Fed’), led by Paul Volker, was presiding over an enormous change in U.S. monetary policy. An adherent of the monetarist tradition, he argued that by pursuing full employment as its primary policy goal, the Fed had created the conditions for inflation without end. Therefore, the Fed shifted to a strategy of restricting money supply and increasing interest rates. The Federal Reserve implemented this policy change (called the ‘Volker shock’) in October 1979. It would drive widespread disinvestment in the domestic manufacturing sector that acted alongside oil price volatility and automotive layoffs to further cripple the American rust belt.<sup>64</sup>

The University attempted to make up for these shocks and shortfalls through increases in student tuition. Between 1971 and 1980, University tuition would almost triple, giving Michigan the dubious honor of charging the highest tuition of its peer institutions. By the end of the 1970s, the University’s form had changed radically in a manner consistent with structural changes in the financing of higher education—from a broadly accessible public institution to a research-focused University sustained by exploding tuition and private giving.<sup>65</sup> Where previously, the state of Michigan had been an unusually stalwart supporter of higher education, by 1980 it had fallen to 35th out of 50 states in rankings of higher educa-

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<sup>63</sup>Joel Cutcher-Gerschenfeld, Dan Brooks, and Martin Malloy, “The Decline and Resurgence of the U. S. Auto Industry” (Economic Policy Institute, May 6, 2015); Arlena Sawyers, “1979 Oil Shock Meant Recession for U. S., Depression for Autos,” *Automotive News*, June 26, 1996, <http://www.autonews.com/article/20131013/GLOBAL/310139997/1979-oil-shock-meant-recession-for-u.s.-depression-for-autos>.

<sup>64</sup>Mark Blyth, *Austerity: The History of a Dangerous Idea* (Oxford, UK: Oxford University Press, 2015); David Harvey, *A Brief History of Neoliberalism* (Oxford, UK: Oxford University Press, 2007).

<sup>65</sup>Michael Fabricant and Stephen Brier, *Austerity Blues: Fighting for the Soul of Public Higher Education* (Baltimore, MD: Johns Hopkins University Press, 2016); Peckham, *The Making of the University of Michigan, 1817-1992*.



tion expenditure per capita<sup>66</sup>

Despite this volatility, it appeared at first as though the fiscal climate would improve for Michigan universities come 1980. In January, governor William Millikan, proposed a 9.5-percent increase to higher education appropriations. The University, needing to set salary and tuition levels, passed a budget in June, well before the state government gave the final word. This budget anticipated a three percent increase, with a baked-in contingency plan for a zero-percent increase. These would prove insufficient. Come November 1980, the state passed down a five-percent cut, leading to an immediate \$9.6 million budget shortfall.<sup>67</sup> These budgetary contractions were dire, especially so because they were taking place in an economy characterized by inflation rates of 13.3 percent (1979) and 12.5 percent (1980), respectively. Even a small increase would have represented a major proportional decrease in spending power, and a 5-percent cut was devastating.

These were the conditions that found the geography department facing discontinuance, with an extraordinary amount of pressure to ‘make hard choices’ and ‘tighten belts’. Harold Shapiro was president of the University during this time and drove much of the discourse. Shapiro was an economist who had first gained notoriety as Vice President of Academic Affairs, in which position he had turned back tenure promotion cases, which “just had never been done.”<sup>68</sup> He advocated a plan of ‘smaller but better’, which eschewed ‘shared poverty’ and across-the-board cuts in favor of targeted cuts to weak units. The weakness of units was a quality to be ascertained by an appointed discontinuance committee.

Dean Knott hardly strove to appear objective in his letter giving direction to faculty on

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<sup>66</sup>Peckham, *The Making of the University of Michigan, 1817-1992*.

<sup>67</sup>Noreen Ferris Wolcott, “U-M Plight Reflects State Economy,” *Michigan Alumnus*, May 1981.

<sup>68</sup>Larimore, interview, n.p.; see also Peckham, *The Making of the University of Michigan, 1817-1992*.

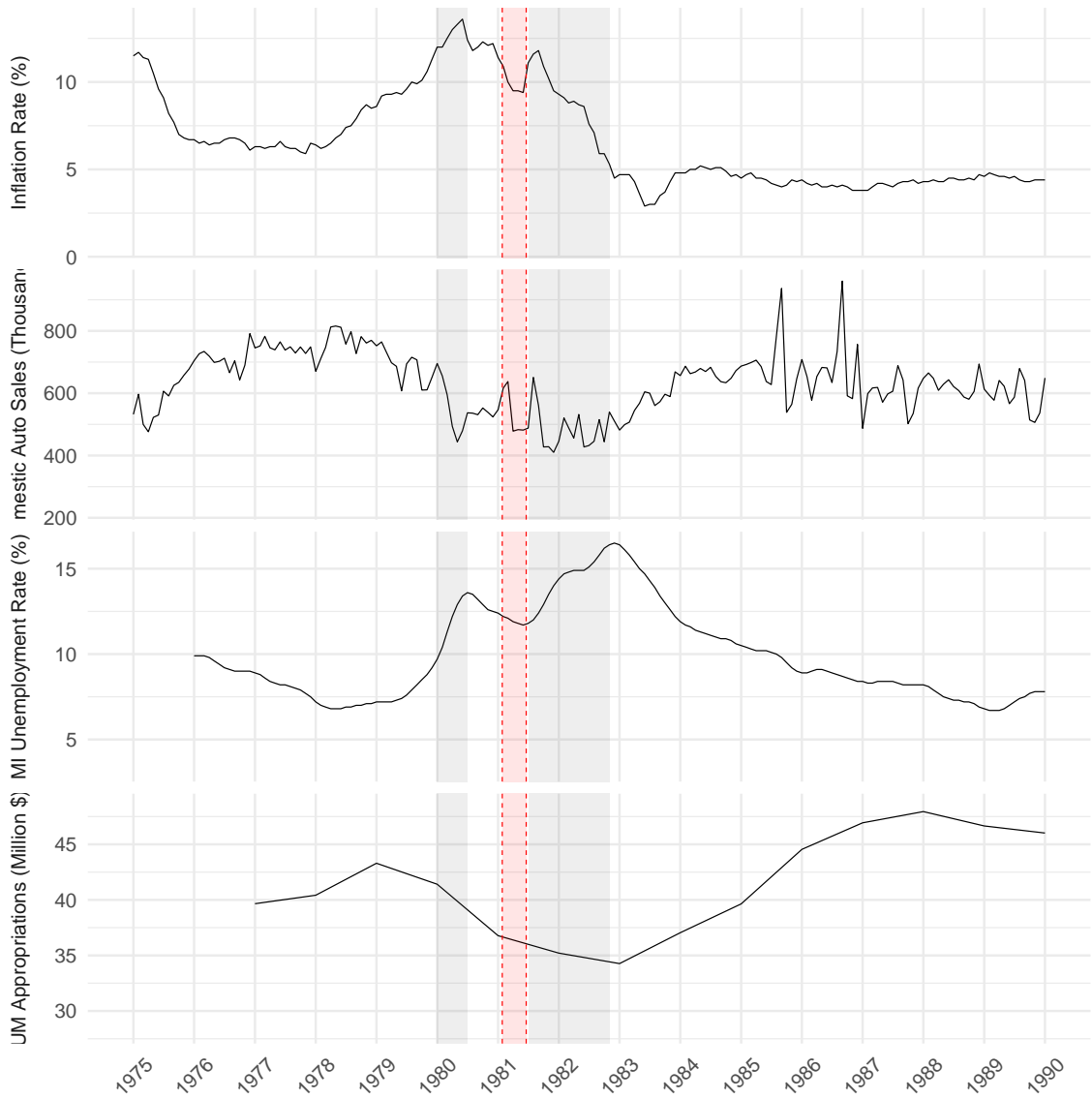


Figure 4.4: The department of geography was discontinued in the midst of broad-based disinvestment retrenchment. Data from the St. Louis Federal Reserve Bank, the Bureau of Labor Statistics, and the Michigan Higher Education Institutional Data Inventory (HEIDI)

the geography review committee: Sidney Fine (History), Harvey Brazer (Economics), and Albert Cain (Psychology). “Our preliminary assessment aroused doubt about the present quality of the department and its prospects for improvement ... We also question whether the discipline is sufficiently coherent and central to the mission of the College for us to continue to support it by means of a departmental structure.”<sup>69</sup> The department objected strenuously to how the review committee was named (and the names on the committee). It was constituted without consultation with the department. It comprised entirely social scientists, despite the geography department’s claim to sit between social and physical scientists. The committee members were from large (and orthodox) departments (history, psychology, economics) and would thus not be sympathetic to arguments in support of smaller departments and more pluralistic disciplines. Finally, two committee members—Sidney Fine and Harvey Brazer—were members of a 1975 College Priorities Committee that had raised doubts as to the necessity of the department. No members of a subsequent Social Science Program Evaluation Committee that reviewed the department favorably in 1977 were named to the review committee. In Nystuen’s assessment, “this does not strike us as a completely impartial choice of membership.”<sup>70</sup> The first of these concerns was addressed by the addition of Arnold Kluge, a zoologist, to the committee. The latter complaints were dismissed as impugning the impartiality of fellow faculty. Brazer, in an interview with the *Michigan Daily*, said that his participation in the 1975 committee shouldn’t be taken to indicate that his mind and that of Sidney Fine were made up; rather, it had acquainted them

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<sup>69</sup>John R. Knott, January 27, 1981, “The Grey Book” (presentation to Regents), Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

<sup>70</sup>John D. Nystuen to John R. Knott, January 28, 1981, “The Grey Book” (presentation to Regents), Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

with the review process. “We are capable of making rational judgments.”<sup>71</sup>

#### 4.5 REVIEWING THE DEPARTMENT OF GEOGRAPHY

The report of the committee assigned to review geography was released on 7 April 1981. This followed a long, contentious period of faculty support for both the department and the review committee, playing out over the course of specially convened faculty meetings.<sup>72</sup> At these meetings, the Dean of LS&A, John Knott, made his case for discontinuance: “I’m calling for an effort to make the hard choices,” arguing that shared poverty was a “sure road to mediocrity.”<sup>73</sup> When released, the committee report recommended discontinuance in dire terms: “we are unanimously agreed that the department of geography cannot be continued in its present form. We believe that to do nothing at this juncture would be a grievous mistake. ... The Department has obviously suffered serious losses that, under present or foreseeable budget circumstances, cannot be repaired. Nor can the Department be expected to function effectively, let alone flourish, as long as its faculty and students believe that its activities are likely to be subject to continuous criticism. ... We are convinced that decisive action must be taken.”<sup>74</sup> Perversely, the very action of reviewing the department (and thereby subjecting it to continuous criticism) was taken as a justification for the most drastic possible outcome of that same review.

The committee recommended either complete discontinuance or, at the very least, the elimination of the program in cultural geography. The committee was persistently vexed

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<sup>71</sup>Rita Clark, “Chairman: Geography Board May Be Biased,” *The Michigan Daily*, February 11, 1981, 1.

<sup>72</sup>Sue Inglis, “Faculty Nixes Suspension of Geography Review,” *The Michigan Daily*, February 18, 1981.

<sup>73</sup>Sue Inglis, “Faculty Divided on Slated Geography Department Cut,” *The Michigan Daily*, February 3, 1981, 1.

<sup>74</sup>Harvey E. Brazer et al., “Report of the Geography Review Committee to the Faculty of the College of Literature, Science, and the Arts, the University of Michigan,” April 1981, 33, “The Grey Book” (presentation to Regents), Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

by the discipline's lack of coherence and its conspicuous absence at elite institutions. The committee notes that not only do such institutions not maintain departments, but that this does not even mean that they have difficulty employing geographers. "Harvard University does not have a Geography Department, but its faculty does include four or five geographers. ... Quality of institution aside, the model four-year college and university in the United States does not include an independent department of geography."<sup>75</sup> The closure of Harvard's department isn't cited as a precedent—Harvard may as well have never offered geography; it is the *absence* of geography at Harvard that is noted, not its discontinuance.

Given the focus of the reviewers on the problems of cultural geography, the term should be clarified, as this particular signifier has always been a moving target, associated with turn after turn even within the discipline. Here, it is opposed to physical geography, urban geography, and cartography/spatial analysis; its practitioners were primarily the type of regional geographer that became associated with 'area studies' programs in the postwar period (for an example on Michigan's faculty, John Kohlers). The weakness of the subfield was partially intellectual and partially practical. The joint appointments enjoyed by these faculty in area studies departments contributed to the erosion of the department's cohesion. Of the thirteen active faculty at the time of the discontinuance, six were cultural or regional geographers. See fig. 4.5 for a contemporary breakdown of faculty by subdiscipline.

Cohesion, though, wasn't only a matter of joint appointments. One of the committee's primary concerns was that exactly those arguments made in favor of the department's continuance—the bridge, the unity myth, the idea that geography bridged the natural and social sciences—in practical terms argued for the opposite. The committee notes that "it

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<sup>75</sup>Ibid., 14.

FACULTY DEPLOYMENT BY SUBJECT MATTER

Major Fields

Name	FTE	Physical	Urban/ trans- porta- tion	Regional	Systematic human/ cultural	Location/ spatial analysis	Cartograph
Asst.Prof. Brewster	1.0	•				•(field)	
Asst.Prof. Brown	1.0		•			•(analytical)	
Assoc.Prof. Clarkson	1.0			•	•		
Prof. Deskens	0.25		•			•(field)	
Prof. Gosling	1.0			•			
Prof. Kish	1.0			•			•(histor
Prof. Kolars	1.0			•	•		
Prof. Larimore	0.5 <del>1.0</del>				•		
Prof. Murphey	1.0			•			
Lectr. Noguchi	1.0	•					
Prof. Nystuen	1.0		•			•(analytical)	
Prof. Outcalt	1.0	•				•(analytical)	
Asst.Prof. Taketa	1.0						•(analyt
Trussler+	0.0		(•)			(• analytical)	
	11.75						

+ Position vacant and frozen 1981-82

Figure 4.5: The department's faculty were approximately split between cultural geography and other sub-disciplines. Image: Eric Robsky Huntley. Original: Bentley Historical Library, University of Michigan.

seems clear that geography is a pluralistic discipline, one that straddles the natural sciences, the social sciences, and, some would say, the humanities. The breadth of the discipline is seen as one of its great merits by those who emphasize the importance of its role in bridging the physical and social sciences.”<sup>76</sup> An endorsement of the unity myth in the abstract, though, does not imply that the argument proves helpful in the context of sustained review: “although lip service is paid to the commonalities among physical and human geographers, there appears to be only limited professional interaction between them. The very arguments that speak in the abstract for the importance of the discipline ... appear to have little applicability here.”<sup>77</sup> In other words, the gulf between the department’s self-justification and its actually-existing work was taken as evidence of the department’s frailty and the discipline’s invalidity.

One of the committee’s primary concerns was that exactly those arguments made in favor of the department’s continuance—the unity myth, that geography bridged the natural and social sciences—in practical terms argued for the opposite. The committee notes that “it seems clear that geography is a pluralistic discipline, one that straddles the natural sciences, the social sciences, and, some would say, the humanities. The breadth of the discipline is seen as one of its great merits by those who emphasize the importance of its role in bridging the physical and social sciences.”<sup>78</sup> An endorsement of the unity myth in the abstract, though, does not imply that the argument proves helpful in the context of sustained review: “although lip service is paid to the commonalities among physical and human geographers, there appears to be only limited professional interaction between them. The very arguments

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<sup>76</sup>Ibid., 33.

<sup>77</sup>Ibid., 31.

<sup>78</sup>Ibid., 33.

that speak in the abstract for the importance of the discipline ... appear to have little applicability here.”<sup>79</sup> In other words, the gulf between the department’s self-justification and its actually-existing work was taken as evidence of the department’s frailty and the discipline’s invalidity.

On the matter of disciplinary coherence, the committee also sought outside help. Three geographers were recruited to provide perspective on the viability of the Michigan department: Julian Wolpert of Princeton University, a regional scientist and locational theorist; John Borchert of the University of Minnesota, a resource geographer; and John Rayner of the Ohio State University, a physical geographer and atmospheric scientist. Surely, this sub-disciplinary make-up had something to do with their suggestion, invoked by the committee, that “cultural geography has diminished in significance as a field within the discipline.”<sup>80</sup> The idiosyncracies of individual geographers were treated as rubrics for the evaluation of the entire department. Wolpert, for example, notes—very much in line with his own research program—that “the discipline and its literature have developed especially rapidly in the last three decades, influenced by a more significant focus on analytic approaches and the application of mathematics and theory development from neighboring fields, e.g. micro and welfare economics and cognitive psychology.”<sup>81</sup> This statement is then used by the review committee to assess Michigan’s graduate training; they note that no graduate students in geography had taken courses in microeconomics and that only one taken in a course in psychology.

In this way, external geographers’ assessments of subdisciplinary trends were used as

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<sup>79</sup>Ibid., 31.

<sup>80</sup>Ibid., 13.

<sup>81</sup>Wolpert in *ibid.*, 26–27.



evidence of Michigan's absence from the vanguard. This is true even though Wolpert advocated for the importance of the field in general, arguing that...

Geography is a well established discipline in most leading universities in the United States and abroad including virtually all state universities ... unlike some of the other neighboring disciplines ... geography straddles both the social and physical sciences and has some tradition within the humanities as well. The field finds its coherence through common attention to the earth ... as a laboratory for the development and testing of theory. Commonality exists also in the methodologies which have been developed to describe and explain processes advantageously observable in the spatial dimension."<sup>82</sup>

The disagreements between trained geographers regarding what constituted legitimacy within the discipline contributed in a very pragmatic way to the devaluation of the department's work. Selecting three prominent geographers was no guarantee of a synthetic view of the discipline (or a generous view of any particular subdiscipline). Recall that in Smith's telling, Isaiah Bowman's indifference towards the Harvard department's research output (and his disgust at Whittlesley's relationship with Herold Kemp) played a role in ensuring its demise, despite his vocal support of geography *in general*.<sup>83</sup>

External reviewers also flag that the department had been badly wounded by the loss of Waldo Tobler, Gunnar Olsson, and Barney Nietschmann in 1977. These scholars followed Melvin Marcus, a physical geographer and glaciologist, who had left in 1974, and were fol-

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<sup>82</sup>Wolpert in *ibid.*, 28.

<sup>83</sup>Smith, "Academic War over the Field of Geography': The Elimination of Geography at Harvard, 1947-1951."

lowed by James Detwyler, an environmental geographer who left in 1978. (In addition, Everette Bannister, assistant professor of physical geography, was killed in a car crash in 1979.) It is possible that these departures were motivated by a fractious department climate that we find referenced in secondary sources. Michael Watts calls the department of the 1970s “a hugely dysfunctional family” in which “personal animosities—as much as intellectual differences—came to dominate. There was little here to take joy in. Upon his departure [Olsson] wrote me that ‘we left in the midst of wine and tears but with little feeling for the Department.’”<sup>84</sup> The feeling was, according to some, mutual. Many in the department saw Olsson’s departure as “the elimination of a destructive, certainly divisive element.” A 1977 report maintains that Olsson’s work and teaching had “wandered from his earlier important contributions” and that “he had become, in the minds of almost all department members, an ‘organizational’ problem, contributing to Departmental difficulties.”<sup>85</sup> We might also speculate that Wolpert’s long association with the recently-departed Olsson colored his view of the department. Wolpert and Olsson had met in a seminar at Uppsala in 1972, where they both participated in a seminar with the Swedish economist Herman Wold. They had subsequently spent time together during Olsson’s American Council of Learned Societies-funded fellowship in the University of Pennsylvania’s Department of Regional Science.<sup>86</sup> It seems likely that Olsson’s departure and his intellectual *détournement* during his time in Ann Arbor shaded Wolpert’s view of Michigan.

Whatever the reason for the departures, they were detrimental to the department’s case.

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<sup>84</sup>Watts, “Of Bats, Birds, and Mice...,” 152.

<sup>85</sup>David Goldberg et al., “Review of the Geography Department Conducted by Social Science Program Evaluation Committee,” 1977, “The Book” from John Nystuen, Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

<sup>86</sup>Trevor J. Barnes, “Gunnar Olsson and Me,” in *GO: On the Geographies of Gunnar Olsson*, ed. Christian Abrahamsson and Martin Gren (Surrey, UK: Ashgate, 2012), 245–58.

Wolpert maintains that “the department has not yet recovered sufficiently from its loss of four senior scholars to have retained its position as the second ranked Department in the nation [as of 1969] but it still enjoys a sound reputation for the prospects of recovery to be excellent.”<sup>87</sup> While the prospects may have been good under normal conditions, this was not true under conditions of austerity. The department received authorization to make a only small number of junior appointments to replace senior faculty. Perversely, this was seen as a failure of competitiveness when it came time for the evaluation: “in a period of scarce or declining resources the Department has not been able to compete successfully within the college for the very small number of new positions, tenured or otherwise, that could be filled each year.”<sup>88</sup>

Borchert was less optimistic in his report to the committee.

If I compare the Michigan Geography Department in aggregate with the most effective university departments here and abroad, certain differences stand out. First, the Michigan department has somewhat less publications of all kinds; ... Second, the comparable departments tend to have larger enrollments in undergraduate courses beyond the introductory level. They have more majors, and they play a larger role in the liberal education of not only students in their own college but also students in the professional schools. Third, in comparable Departments one would get more the feeling that he [sic] is at a node of activity<sup>89</sup>

Indeed, the reviewers cite Morrill’s study of the productivity of geography departments,

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<sup>87</sup>Wolpert in Brazer et al., “Report of the Geography Review Committee to the Faculty of the College of Literature, Science, and the Arts, the University of Michigan,” 16–17.

<sup>88</sup>Ibid., 28.

<sup>89</sup>Borchert in *ibid.*, 18.

in which Michigan ranked an underwhelming 24th in research publications.<sup>90</sup> Ironically for an essay that begins, “despite my inherent distrust of rankings, and my aversion to the tendency of legislatures and boards of trustees to rely on the crudest quantitative measures of the value of programs,”<sup>91</sup> the essay was marshalled in support of the department’s devaluation by university executives. Morrill warns that “implied rankings . . . should be taken with extreme caution, not only because the data are not highly reliable, but because the variables cannot pretend to measure value adequately.”<sup>92</sup> Yet John Knott describes Morrill’s report to Billy Frye as containing “what we regard as the most reliable rankings available.”<sup>93</sup>

In addition to the opinions of external reviewers, the committee could draw on an extensive paper trail of previous reviews that had been accumulating since the mid 1970s. These collectively suggest that discontinuance was on the table long before 1981 and that geography was a prime candidate. The first of these reviews took place in 1975, and was conducted by the Program Evaluation Committee for Social Sciences (PECSS) comprised of Gerald Kline (Journalism), Jan Kmenta (Economics), Daniel Levine (Political Science), Warren Norman (Psychology), Bradford Perkins (History), and Maxwell Reade (Mathematics).<sup>94</sup> The review is lukewarm. It notes that the American Council on Education (ACE) ranking of the department had slipped to the ninth position in 1964, to recover second position in 1969. However, outside evaluators from the discipline (who remain unnamed) raise “quite emphatic” doubts as to whether the same rating would hold in 1975, “contending that in recent

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<sup>90</sup>“Productivity of American Ph.D.-granting Departments of Geography,” *The Professional Geographer* 32, no. 1 (1980): 85–89, doi:10.1111/j.0033-0124.1980.00085.x.

<sup>91</sup>Ibid., 85.

<sup>92</sup>Ibid., 86.

<sup>93</sup>John R. Knott to Billy Frye, May 8, 1981, “The Grey Book” (presentation to Regents), Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

<sup>94</sup>“Report of the Program Evaluation Committee for the Social Sciences,” 1975, “The Book” from John Nystuen, Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

years, Michigan's reputation [had] already begun to slip."<sup>95</sup> They question the department's "selective pluralism," suggesting that it may be leading to a "department pushing only a little in each of too many ways."

This mixed evaluation was taken up by the College Priorities Committee, who issued a subsequent report, used by the college to dictate priorities for resource allocation—this was the body that included Brazer and Fine, who would later become contentious additions to the 1981 committee. This group very selectively read the 1975 report, choosing to emphasize the negative assessments of faculty productivity proffered by outside reviewers. Additionally, the CPC chose to editorialize, unprompted by the PECSS, that "many distinguished Universities do not have Geography departments," which they take to "raise the question as to whether this university must have one."<sup>96</sup> The CPC read the absence of geography at major institutions as an indictment of its necessity, if not necessarily its merit.

There was yet another review in 1977; a new Social Science Program Evaluation Committee (SSPEC) was tasked with evaluating the geography department.<sup>97</sup> This new committee comprised chair David Goldberg (sociology), Donald Eschman (geology), Gerald Kline (Journalism)—who had also served on the 1975 SSPEC committee—and David Krantz (psychology). They were instructed to "discern the direction of the field in general, to put [their] fingers on the pulse of the department and to develop a set of recommendations to the College for a strategy that could range from increasing the Geography budget to recommending

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<sup>95</sup>Ibid., 39.

<sup>96</sup>Harvey E. Brazer et al., "Interim Report of the College Priorities Committee," December 1975, 54, Program evaluation materials from John Nystuen, Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

<sup>97</sup>Goldberg et al., "Review of the Geography Department Conducted by Social Science Program Evaluation Committee."

deletion of the department”<sup>98</sup> In 1977, discontinuance was very much on the table, in the context of looming fiscal problems in the state and at the University.

In many ways, this new committee seemed to be answering the negative report of the 1975 College Priorities Committee, which dwelt on the possible inaccuracy of the ACE ranking, and the fact that prestigious institutions often went without geography departments. The report states that the latter fact in particular “[kept] cropping up in discussions and earlier documents” and therefore required comment. “We react to this in a few ways: 1. The few departmental deletions that occurred are rather old history at this point in time. The deletions took place when the field was different. 2. Each of these places has many geographers. 3. What is to be gained from dispersal of a department faculty to several other departments?”<sup>99</sup> On the one hand, the Goldberg committee characterizes recent changes in geography as “fairly normal for the development of most social science disciplines,” and even maintains that geography is “a growing discipline of increasing importance”; on the other, the Goldberg committee notes that it “has some serious internal divisions” that were not resolved by the emergence of computation and nomothetic approaches. Modeling, though, had also failed to make the other schismatic disciplines of the social sciences coherent: “the expected theoretical messiah from mathematical model-building has not emerged as it has not emerged in Sociology, for example.”<sup>100</sup> Writing on behalf of the committee, Goldberg suggests that what is unique to geographers is an absence of substantive discernment: “that is, they are crippled by the fact that Geography is not Psychology, Sociology, Economics.” Goldberg concludes, “so what do I do?”<sup>101</sup> Ultimately, they recommend extending financial

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<sup>98</sup>Ibid., 1.

<sup>99</sup>Ibid., 3.

<sup>100</sup>Ibid., 3.

<sup>101</sup>Ibid., 4.

support to geography, to help recruit new hires that would fill the shoes (and lines) of Tobler, Olsson, and Nietschmann. The University, as discussed above, took the opposite tact.

These reports did not damn the department. However, by providing arguments that could be selectively excerpted, they contributed to an evidentiary body that could be used by later evaluators. This body of evidence became very useful in the early 1980s for a discontinuance review committee arguing for the termination of the department. Furthermore, the authors of associated reports became combatants and objects of dispute in the proceedings that followed the report's release.

#### 4.6 DISPUTING THE REVIEW

Faculty voted on the report of the discontinuance review committee on 13 April 1981 (and had previously been lobbied by enterprising poster-makers, fig. 4.6). Sue Inglis of the *Michigan Daily* calls it “one of the most turbulent faculty meetings in the history of the University”<sup>102</sup> Harvey Brazer, member of the Review Committee opened the special LS&A faculty, introduced a motion to ‘approve’ the report.<sup>103</sup> The motion was seconded by Sydney Fine, a second member of the Review Committee. Many raised the by-now familiar objection that both of the men who introduced the motion were biased towards dire conclusions by their previous participation in geography's evaluation. Many criticized the university for not making resources available for hiring new faculty, noting the perversity of a situation in which a department was being punished for not successfully recruiting faculty using faculty lines that the University refused to make available. The meeting's message to administra-

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<sup>102</sup>Sue Inglis, “Geography Review ‘an Injustice,’” *The Michigan Daily*, March 7, 1981, 1; see also Kathy Hulik, “Don't Cut Geography, Says Faculty,” *The Ann Arbor News*, April 14, 1981.

<sup>103</sup>“Minutes of Special LSA Meeting,” April 13, 1981, “The Book” from John Nystuen, Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

tors, though, was diluted by semantic confusion. The report put forward two alternatives (complete discontinuance and discontinuance of cultural geography)—for which would ‘approval’ of the report signal support? To address this confusion, professor Bradford Perkins moved to substitute the word ‘approve’ with ‘accept and refer to the Executive Committee’. At the close of discussion, the amended language was defeated 104-110, as was the original motion: a count of 80-138 with 22 abstentions. The faculty had voted to not ‘approve’ and to not ‘accept and refer’: certainly a vague outcome.

Despite ongoing contention (and the failure of the faculty to endorse the report), the LS&A Executive Committee formally recommended the discontinuance of the department to Billy Frye and President Shapiro on May 7. In an accompanying letter, Knott speaks of centrality and the failure of the department to meet the standards of the unity myth: “although the study of the relationship of people to their physical and social environment is important to the mission of the University and should continue to be encouraged, we do not find the Department of Geography to be the central focus of such studies in the University.”<sup>104</sup> Frye and Shapiro announced their support for discontinuance on June 16, passing the final vote on to University regents.<sup>105</sup>

Knott held a final open meeting with faculty and gave a revealing prepared address. Knott regrets that so much discussion focused on fiscal matters and procedural minutiae instead of more fundamental questions about ‘the nature of the field.’

We regard this as unfortunate, since it was a significant consideration for us.

... We find geography a remarkably fragmented discipline, the parts of which

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<sup>104</sup>John R. Knott et al. to Billy Frye, May 7, 1981, “The Grey Book” (presentation to Regents), Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

<sup>105</sup>Andrew Chapman, “Frye Urges Geography Elimination,” *The Michigan Daily*, June 17, 1981.



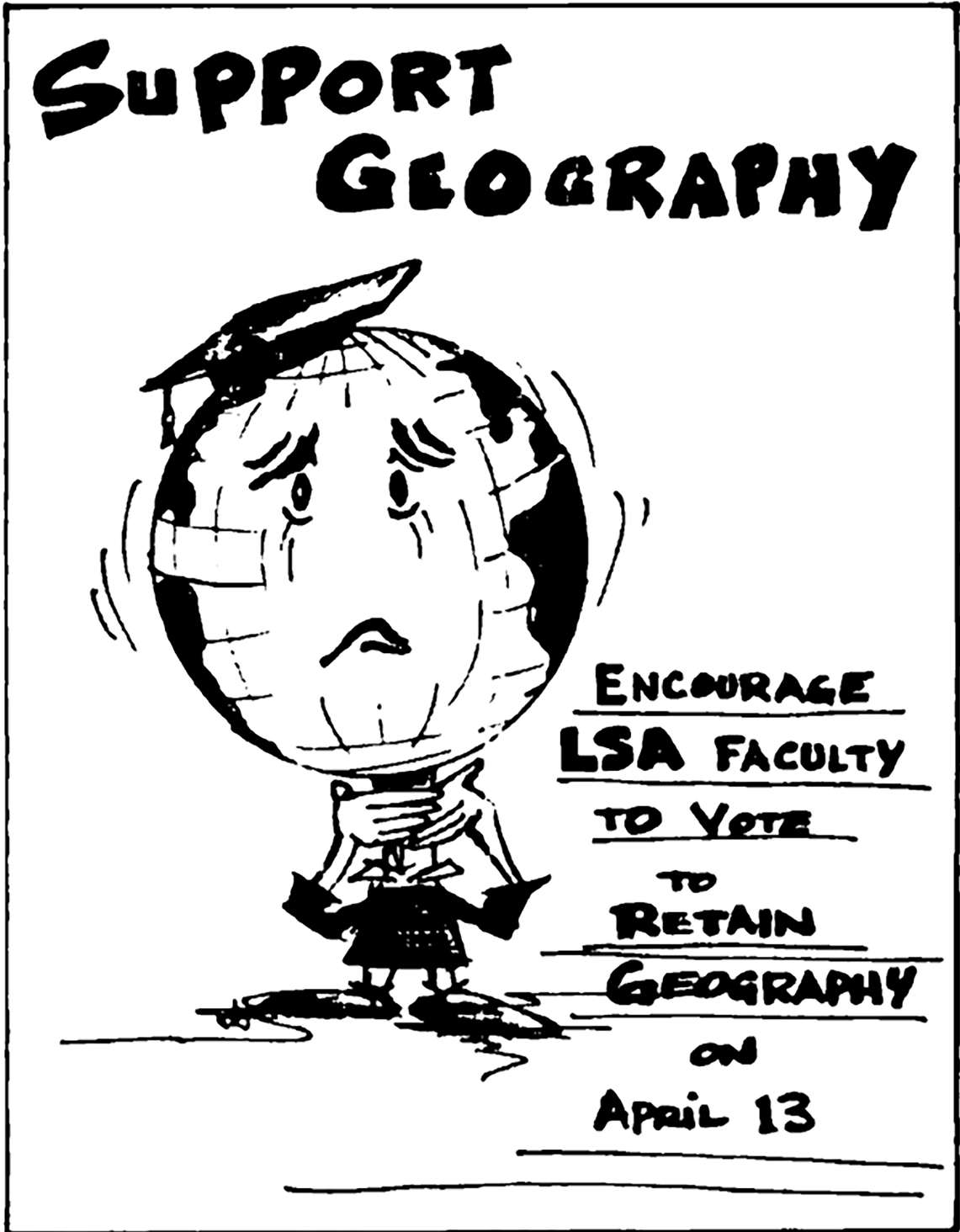


Figure 4.6: A poster produced to encourage faculty to support the geography department at the 13 April meeting. Copyright ©1981 by Alumni Association of the University of Michigan. Reprinted with permission from the May 1981 issue of Michigan Alumnus magazine.

bear less relationship to each other than is usual in a department. ... We believe that the discipline is vulnerable [in times of retrenchment] because it is not as coherent, and not as essential, as many others.<sup>106</sup>

For reasons more disciplinary than fiscal, the discontinuance of the department was a product of a vulnerability brought on by its incoherence. Indeed, the relationship of its parts—the physical and social sciences it purports to bridge—was read as fragmented, not holistic. In this address, Knott also cited a 1979 essay by Libbee and Wilbanks in *The Professional Geographer*. This essay's argument must have seemed quite prescient. "The bad news is that geography may not survive the next several decades as a subject that is taught in most American colleges and Universities."<sup>107</sup> In a time of retrenchment brought about in part by declining enrollments and failing state support for public education, the authors argue that University administrators will be faced with a difficult decision: make broad, across-the-board cuts to program budgets or fully discontinue programs seen as less essential to the University while maintaining or increasing funding levels for flagship departments. Given such a choice, they argued, many will choose the latter. Under such conditions, departments that remain after essentials are accounted for will be targeted. "We shall refer to these departments as 'pigeons.' Next comes the pigeon shooting."<sup>108</sup>

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<sup>106</sup>John R. Knott, "Statement at Hearing on the Department of Geography," June 8, 1981, "The Grey Book" (presentation to Regents), Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

<sup>107</sup>Thomas J. Wilbanks and Michael Libbee, "Avoiding the Demise of Geography in the United States," *The Professional Geographer* 31, no. 1 (1979): 1, doi:10.1111/j.0033-0124.1979.00001.x.

<sup>108</sup>*Ibid.*, 2.

#### 4.7 A DEPARTMENT DISCONTINUED

We end where we began; on 19 June 1981 around 10:00am, the Regents of the University of Michigan unanimously declared that the department would be cease to exist come 1 July 1982. The meeting took place over two days, beginning on the 18th at 1:00pm. Billy Frye reiterated the arguments made by the review committee. The University was riding fiscally turbulent waters; the department suffered for excellence; and the department was not central to the educational mission of the University.<sup>109</sup> Nystuen begged for the lesser of two evils: elimination of cultural geography. Though the executive committee had recommended selective discontinuance as a viable, and perhaps preferable, option, Knott confirmed that it was never seriously considered. As the regents began their deliberation, the *Michigan Daily's* editorial board voiced its 'reluctant' support for discontinuance. The editorial staff were persuaded that the discipline of geography "endured as a kind of all-encompassing educational grab bag."<sup>110</sup>

If one was inclined to believe an economic account of the closure, one would be surprised to read that Regent Sarah Power found "the financial argument for geography discontinuance to be the least persuasive" of the rationales presented.<sup>111</sup> During the meeting which closed the department on account of hard times, the financial justification was not what made up the mind of at least one voting member of the Board of Regents. Rather, it was arguments about centrality and disciplinary necessity. Nystuen had attempted to preempt this, writing a letter to the Regents, imploring that even though "to non-geographers,

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<sup>109</sup>University of Michigan Board of Regents, "June Meeting, 1981," in *Proceedings of the Board of Regents (1978-1981)* (University of Michigan, 1981), 945–75.

<sup>110</sup>"Reluctant Assent," *The Michigan Daily*, June 19, 1981.

<sup>111</sup>Andrew Chapman, "Regents Ax Geography: Vote Marks End of Long, Rocky, Review," *The Michigan Daily*, June 20, 1981.

these sound like different disciplines” and though “there is not much joint research across these topics ... there is coordination in training at both undergraduate and graduate levels. ... We know the subprograms of the department augment one another.”<sup>112</sup> This argument failed to convince.

In the wake of the closure, all eight of the department’s tenured faculty were, relocated,<sup>113</sup> though no two professors were appointed in the same department. Non-tenured faculty were not afforded the same treatment—all three left the academy. The formal study of geography lasted only a few more years, as the students who had already begun their studies brought them to completion. The final master’s degree was awarded in 1982-1983. The final PhD in 1984-1985. The last undergraduate degree in geography from the University of Michigan was awarded in 1985-1986 (see fig. 4.7).

#### 4.8 THE QUESTION OF RADICALISM

There was at least one argument for discontinuance that we did not find in the archives, which nevertheless haunts the discourse surrounding the closure: there are whispers that the department was simply too radical. Lauria et al. recently suggested that “[the state of] Michigan was ground zero” for radical geography.<sup>114</sup> Did the state’s flagship University—a noted hotbed of student activism—contribute to the explosion? After all, Students for a Democratic Society began in Ann Arbor in the early 1960s,<sup>115</sup> issuing the famous Port

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<sup>112</sup>John D. Nystuen to University of Michigan Board of Regents, May 28, 1981, “The Grey Book” (presentation to Regents), Box 127, Vice President for Academic Affairs Central Files, Bentley Historical Library, Ann Arbor, MI.

<sup>113</sup>Julie Hinds, “6 of 9 Geography Profs Relocated,” *The Michigan Daily*, December 12, 1981; Barry Witt, “8 Geography Professors Relocated,” *The Michigan Daily*, January 19, 1982.

<sup>114</sup>Mickey Lauria et al., “Radical Geography in the Midwest,” in *Spatial Histories of Radical Geography: North America and Beyond* (Hoboken, NJ: Wiley, 2019), 262.

<sup>115</sup>Martha Prescod Noonan, “Experiencing the Sixties at the Intersection of SDS and SNCC,” in *A New Insurgency: The Port Huron Statement and Its Times*, ed. Howard Brick and Gregory Parker (Ann Arbor, MI: Maize Books, 2015).

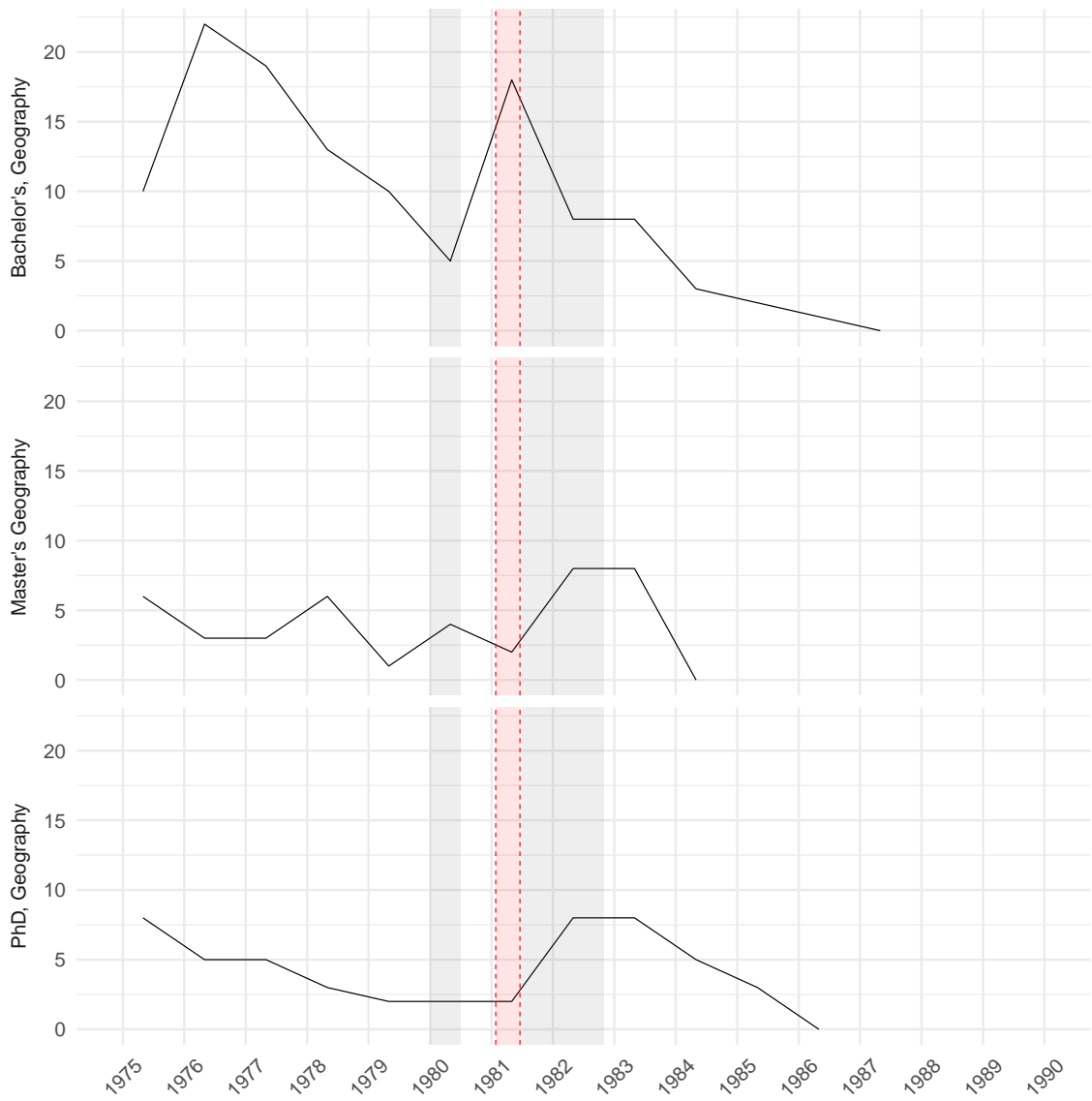


Figure 4.7: Graduations from the department. Data from the University of Michigan Office of the Registrar.

Huron statement from a United Auto Workers retreat;<sup>116</sup> the Black Action Movement regularly disrupted University operations, demanding that the administration ‘open it up or shut it down’;<sup>117</sup> the anti-racist White Panther Party bombed the Ann Arbor CIA office;<sup>118</sup> a teach-in to protest war in Vietnam kept students and faculty up all night in 1965;<sup>119</sup> and student riots that sought to ‘liberate’ south University ended in police violence.<sup>120</sup>

The geography department involved itself collectively in 1969, when the Michigan campus played host to the annual meeting of the Association of American Geographers. This was after the association made the then-controversial decision to relocate the conference away from Chicago to protest the brutal police suppression of protesters at the Democratic National Convention.<sup>121</sup> Clark Akatiff calls the meeting that unfolded the ‘insurrectionist’ Ann Arbor meeting.<sup>122</sup> Warren and Bunge’s Detroit Geographical Expedition and Institute<sup>123</sup> brought “the presence of the black streets to the walls of Academe. There were acts of showy militancy. Free Huey was scribed on the wall. Militant interventions were forced on staid academic panels about the ‘Problem.’”<sup>124</sup> However, it is not clear that this actually

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<sup>116</sup>Students for a Democratic Society, *Port Huron Statement* (New York, NY: Students for a Democratic Society, 1964).

<sup>117</sup>Alan Glenn, “‘Open It up or Shut It Down’: The 1970 Black Action Movement Strike at Michigan,” *The Ann Arbor Chronicle*, March 30, 2010.

<sup>118</sup>Christopher Zbrozek, “The Bombing of the A2 CIA Office,” *The Michigan Daily*, October 24, 2006.

<sup>119</sup>Richard D. Mann, “The Ann Arbor Teach-in and Beyond: An Oral History,” in *A New Insurgency: The Port Huron Statement and Its Times*, ed. Howard Brick and Gregory Parker (Ann Arbor, MI: Maize Books, 2015).

<sup>120</sup>William B. Treml, “Police, Youths Clash Near U-M,” *The Ann Arbor News*, June 18, 1969.

<sup>121</sup>Linda Peake and Eric Sheppard, “The Emergence of Radical/Critical Geography Within North America,” *ACME* 13, no. 2 (2014): 305–27, <https://acme-journal.org/index.php/acme/article/view/1009>; Preston Everett James and Geoffrey J. Martin, *The Association of American Geographers, the First Seventy-Five Years, 1904-1979* (Washington, DC: Association of American Geographers, 1978).

<sup>122</sup>Clark Akatiff, “Roots of Radical Geography,” *Yearbook of the Association of Pacific Coast Geographers* 78, no. 1 (2016): 258–78, doi:10.1353/pcg.2016.0014.

<sup>123</sup>Gwendolyn C. Warren, Cindi Katz, and Nik Heynan, “Myths, Cults, Memories, and Revisions in Radical Geographic History: Revisiting the Detroit Geographical Expedition,” in *Spatial Histories of Radical Geography: North America and Beyond* (Hoboken, NJ: Wiley, 2019), 59–86.

<sup>124</sup>Akatiff, “Roots of Radical Geography,” 7–8.

led to blacklisting.

Finally, it must be said that we cannot rule out racism and sexism as reasons the department was subject to such consistent review in the 1970s; Ann Larimore told us that much of the scrutiny to which the department was subjected throughout the 1980s could be attributed in part to institutionalized race and gender bias at the University. Donald Deskins was the first person of color to become chairperson of an academic department in the College of Literature, Sciences and the Arts. He led numerous studies critical of the university and discipline's whiteness. Many of these were under the auspices of the Commission on Geography and Afro-America (COMGA), an initiative of the Association of American Geographers begun in 1968 with a grant from the U.S. Office of Education.<sup>125</sup> The department also had an unusually high number of women on the faculty. So while the archive was silent on this matter—to be expected—we do acknowledge that the department may have been scrutinized for reasons other than its performance.

The argument regarding department radicalism is sometimes made with reference to personnel as well. Lauria et al. suggest that Gunnar Olsson and Barney Nietschmann were radicalizing forces in the department.<sup>126</sup> To some degree, this is true. Olsson, for example, had published actively in *Antipode* from its earliest years onward; in doing so, he pulled

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<sup>125</sup>Studies published by COMGA include Donald R. Deskins, Saul B. Cohen, and Linda J. Speil, "Geography and Afro-America: The Anatomy of a Graduate Training and Curriculum Development Project," *Journal of Geography* 70, no. 8 (1971): 465–71, doi:10.1080/00221347108981893; Donald R. Deskins and Linda J. Speil, "The Status of Blacks in American Geography: 1970," *The Professional Geographer* 23, no. 4 (1971): 283–89, doi:10.1111/j.0033-0124.1971.00283.x; Donald R. Deskins and Linda E. Sibert, "Blacks in American Geography: 1974," *The Professional Geographer* 27, no. 1 (1975): 65–72, doi:10.1111/j.0033-0124.1975.00065; Studies conducted prior to COMGA included Ann E. Larimore, Earl P. Scott, and Donald R. Deskins, "Geographic Activity at Predominantly Negro Colleges and Universities: A Survey," *The Professional Geographer* 21, no. 3 (1969): 140–44, doi:10.1111/j.0033-0124.1969.00140; Ronald J. Horvath, Donald R. Deskins, and Ann E. Larimore, "Activity Concerning Black America in University Departments Granting MA and Ph.D. Degrees in Geography," *The Professional Geographer* 21, no. 3 (1969): 137–39, doi:10.1111/j.0033-0124.1969.00137.

<sup>126</sup>Lauria et al., "Radical Geography in the Midwest," 262–65.

Michigan graduate students into its orbit. His well-known “Some Notes on Geography and Social Engineering” paper appeared in a special issue given over to Olsson’s students at Michigan who had begun to call into question the “epistemology of social geography.”<sup>127</sup> However it is not quite so simple; even his appreciative assessors offer a more complex picture. Mels calls Olsson’s political orientation a ‘politically conservative idealism’<sup>128</sup> and Dear points to his ‘progressive conservatism.’<sup>129</sup> Even the *Antipode* special issue cited above begins with his disclaimer that the work was of a different character than that which generally appeared in the journal’s pages and a critique of radical conventionality. (“To put it bluntly, I myself have never understood why most so-called radicals and concerned liberals insist on being so conventional in their scholarly work.”<sup>130</sup>) Besides, both Olsson and Nietschmann decamped in 1977, suggesting that their reputations may have played a part in the mid-1970s reviews but could only have done so indirectly in the 1981 process. Their departures, along with that of Tobler, were catalysts of the closure, not inhibitors. We cannot categorically rule out the role of the department’s politics in the discontinuance proceedings. However, it seems a relatively marginal cause among a range of more direct causes.

#### 4.9 CONCLUSION: ‘WE AIN’T GOT NO IMAGE’

Several months after the closure of Michigan geography was announced, George Kish gave a plenary address at the annual meeting of the AAG East Lakes Division. Having witnessed the long and bruising closure of his home department over the previous year, Kish was moved to

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<sup>127</sup>Gunnar Olsson, “Preface,” *Antipode* 4, no. 1 (1972): iv–v, doi:10.1111/anti.1972.4.1.iv, iv.

<sup>128</sup>Tom Mels, “Between the Castle and the Trial: The Spaceless Spaces of Planning” in *GO: On the Geographies of Gunnar Olsson*, by Christian Abrahamsson and Martin Gren (Surrey, UK: Ashgate, 2012), 143–54.

<sup>129</sup>Michael Dear, “Gunnar Olsson: A Very Short Introduction,” in *GO: On the Geographies of Gunnar Olsson*, by Christian Abrahamsson and Martin Gren (Surrey, UK: Ashgate, 2012), 91–100.

<sup>130</sup>Olsson, “Preface,” v.



give a talk about “the survival of our discipline.”<sup>131</sup> He was both diagnostic and prognostic, in the manner of a doctor for whom the disease had become rather personal.

We’ll do the best we can. We’ll try to keep geography alive as a discipline, as a word that should be part of the University, as an established field of teaching and learning. It’s going to be a lot harder now than it would have been some years back. My only hope is that no one will think that it could only happen once. That no one will think that Michigan was a freak accident. ... I come back to this same notion: the geographer? What do you do? What is it? Just what is it that you do? We have fallen as a profession down very severely. We have a tremendous job before us. Michigan may be an isolated case. I hope and pray it is. But that hope and that prayer is not based on any realistic assessment of the situation.<sup>132</sup>

Kish reached into recent history, recognizing that while the discontinuance might have come as a shock to the outside observer, it was by some measures a long time coming:

We ain’t got no image. We just haven’t. I’m dead serious. ... Seven years ago, a committee of the College of Literature Sciences and the Arts, ... made the following statement: “Harvard does not have a geography department.” I hear that once more in the lines that follow: Yale doesn’t have a geography department. Stanford doesn’t have a geography department. Why should we have one? The same statement could be made in other places. The arguments to conquer that

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<sup>131</sup>Kish, “We Ain’t Got No Image,” n.p.; he also published a diagnostic report with Robert Ward in the *Newsletter of the AAG*, George Kish and Robert M. Ward, “A Survival Package for Geography and Other Endangered Disciplines,” *AAG Newsletter* 16 (December 1981): 8.

<sup>132</sup>Kish, “We Ain’t Got No Image,” n.p.

do not come easily. The strongest argument that all of us can provide is to, one, make sure one that people know who we are, what we do, and two, that we know where we fit in.<sup>133</sup>

As we've demonstrated, the discontinuance of geography at the University of Michigan is not reducible to dire financial straits, though these these were catalytic. The case against geography was made before austerity came to Ann Arbor. It was not solely caused by departmental radicalism, though it may have played a part. It was not solely caused by the flight of senior scholars to greener pastures, though this certainly drove down productivity metrics. When austerity arrived, geographers, asked to formally review the department, only tepidly went to bat. And when pressed, recourse to the notion that geographers 'bridge' the natural and the social sciences proved inadequate for a department—like so many others—for whom the myth of the unity of geography was rather notional. It also meant, crucially, that a department could be cut—and austerity performed—without raising the prospect of a challenge to tenure. While lines leading to the discontinuance of Michigan geography were many, we find that they follow those of the Harvard case in at least this way: that both are episodes in a longer history of institutional erosion that has much to do with a disagreement between the stories we tell about geography and the practices associated with being an academic geographer.

It is our wager that by attending to these histories of discontinuance, we can begin to articulate why three basic questions—'what is geography?', 'what is geography's history?', and 'but why geography?'—have been so intermingled in the American university. Unity myths recur and return. So too do institutional challenges to the legitimacy, productivity,

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<sup>133</sup>Ibid., n.p.

necessity, and polity of geographers and geography. It is our hope that this serve as a stimulus to further projects explicating the convenient myths hat break down under historical scrutiny. There is no shortage of discontinuance case studies; it is by examining these acute moments of de-mattering and breakdwon that historians of geography might contribute to both more realistic histories of our discipline, and more realistic lines of defense, grounded in the realities of geography's fragile place in academic discourse.

*The Promise of Drawing*

Forgive me; I again indulge my appetite for allegory.

In 1964, the University of Iceland's new computing center took delivery of an IBM 1620 Model II scientific computer, the purchase of which was financed largely by the Icelandic Development Bank.<sup>1</sup> On arrival, the machine corresponded to no word in the Icelandic language. In many language traditions, a loanword would suffice to describe the device. The Icelandic Language Council, however, enforced (and enforces) a fairly rigorous policy of linguistic purism, or what Ari Páll Kristinsson, past director of said council, more prosaically refers to as the 'Icelandic vocabulary tradition'. Since at least the 17th century it has been conventional that new technological and conceptual arrivals are challenges that can be met by old words recombined or repurposed.<sup>2</sup>

The task of naming the newly arrived device fell to Sigurður Nordal, a University of Iceland philologist, diplomat, author of major texts on Icelandic culture, sagas, and literature, as well as the former Charles Eliot Norton Professor of Poetry at Harvard University.<sup>3</sup>

Nordal proposed a new portmanteau to describe the IBM machine. It would be a *tölva*, a

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<sup>1</sup>Magnus Magnusson, "The First Computers (Fyrstu Tölvurnar)," *Ský.is*, 2003, <https://www.sky.is/index.php/20-faghopar/oeldungadeild/123-fyrstu-toelvurnar>.

<sup>2</sup>"The Strange Reinvention of Icelandic," *The Economist*, December 19, 2017, <https://www.economist.com/christmas-specials/2017/12/19/the-strange-reinvention-of-icelandic>.

<sup>3</sup>"Sigurður Nordal (1886-1974)," *The Árni Magnússon Institute of Icelandic Studies*, accessed December 17, 2018, [http://www.arnastofnun.is/page/sigurdur\\_nordal\\_en](http://www.arnastofnun.is/page/sigurdur_nordal_en).

portmanteau of *tala*—meaning ‘number’—and *völva* - meaning ‘fortune-teller’, or ‘goddess.’<sup>4</sup> Computation was thus playfully tied to spiritualism and to prophecy, to futures and to numeracy. In this way, it became the case that to speak of computation in Icelandic is to speak of what is visible in numerical silhouette through the fog of the yet-unknown.

Worry not, dear reader. My intention is not to begin, at the end, a new line of inquiry into Icelandic linguistic history; this text is already overfull of lines and dalliances. I flirt, briefly, with this novel name for computation because of what it brings together, and because of the dream it seems to engender. That computation was understood to be a matter of futurity, of prediction, of prophecy, even as it spoke truths about futures in a numerical tongue. In the world that we now occupy—‘we’ here being shorthand for the relative elites of the colonizer nations—it is still the case that computation has the persistent sheen of the world-yet-to-come, alternatively utopian and dystopian. We live in a moment of acute computational fervor that whiplashes between apocalyptic and messianic. It is not controversial to acknowledge the degree to which many actors in our milieu see salvation from our accumulated messes shimmering in the growth of the planet’s computational carrying capacity and in data-driven urban interventions built ‘from the internet up’ (in the language of Alphabet’s Sidewalk Labs). This is the case even as a persistent drumbeat of leaks, inquiries, and push notifications strongly suggest that citizens, particularly those already on the margins, can no longer realistically expect a life uncaptured and unprofiled when our social infrastructure is configured in the way that it is.<sup>5</sup> And yet we can also see here a quite unorthodox

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<sup>4</sup>John Charles Griffiths, *Modern Iceland* (London, UK: Pall Mall Press, 1969); Birgit Brock-Utne, “The Growth of English for Academic Communication in the Nordic Countries,” *International Review of Education* 47, nos. 3-4 (2001): 221–33, doi:10.1023/A:1017941523866.

<sup>5</sup>Simone Browne, *Dark Matters: On the Surveillance of Blackness* (Durham, NC: Duke University Press, 2015); Joy Buolamwini and Timnit Gebru, “Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification,” in *Conference on Fairness, Accountability and Transparency*, 2018, 77–91,

relationship between quantitative technique and a form of fortune-telling. This suggests, to me, that describing the world technically shapes those descriptions into a form of evidence that does not only tell us of things that might befall the earth, but convinces, persuades, and impresses.

What do descriptive techniques—mapping, computation, geographic inquiry—tell us about the future? And what have the forms of evidence that these techniques take had to do with the future of geographic inquiry? I traced three episodes in the history of geographic and para-geographic inquiry, each of which speaks differently to futurity, knowledge, and anxiety. In tracing the formation of specific forms of ecological thought as they emerged around interdisciplinary networks, I sought to understand how spatialized scientific knowledges became susceptible to stacking. As I showed in the words and works of Ian McHarg, the layer was a crucial spatial metaphor for understanding, and therefore anticipating, the threatening futures of postwar U.S. environmentalism—point-source pollution, rapacious exurban development, agrochemical despoilation. If knowledges could be assembled in a manner appearing both complete and coherent, future degradation could be preempted. Layered knowledge was a prescription meant to address the mid-century sense of environmental crisis. It was also a prescription addressing what I call ‘ought anxiety’, or the anticipated inadequacy of knowledge, as such, to effect change. Building on Frances Harvey’s argument that certain practices associated with GIS are traceable through the ‘vertical holism’ of Hartshorne and Ritter, I argue that it also puts us in touch with an alternative and unfortunately distended school of cultural geography populated by Carl Sauer

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<http://proceedings.mlr.press/v81/buolamwini18a.html>; Virginia Eubanks, *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor* (New York, NY: St. Martin’s Press, 2018); Emily Kaufman, “Policing Mobilities Through Bio-Spatial Profiling in New York City,” *Political Geography* 55 (2016): 72–81, doi:10.1016/j.polgeo.2016.07.006.

and George Perkins Marsh, as well as the planning works of Patrick Geddes and Jacqueline Tyrwhitt. Here, pre-computational approaches to integrative planning were grounds for future-making as an on-ramp to considering how the promise of GIS expanded the horizontal extent of McHarg's imagination.

I continued my conversation with McHarg through his later work, which has gone largely ignored—this is a great irony. Even as he is elevated by geographers, planners, and GIScientists as a progenitor of GIS, the period of time in which he came into closest contact with its early practitioners is almost fully absent. On the one hand, then, I simply offer a correction to the historical record by examining in detail the form of McHarg's engagement with GIS and early geocomputation. As McHarg's focus shifted from regional studies to broad proposals for a reconfigured environmental regime, he imagined a radical upscaling of his ecological inventory method, enabled by GIS and computation: from the region, to the nation-state, to that of the planet itself, a planet he named Gaia. I examine this move—planetarity—as another epistemic response to 'ought anxiety', as both an empirical aspiration and aesthetic rhetoric meant to insure the validity and urgency of ecological concerns. Contemporary mass mobilization around climate change and innovations in social theory suggest that even as the planet imagined as a scale for inquiry is an established fact, planetarity can be claimed as a means by which to establish urgency. It is also no guarantee; McHarg's efforts to implement his vision of a planning practice beholden to Gaia was a failure. It is a difficult thing to meet grandiose aesthetics with practice.

The disagreement—between appeals to disciplinary holism and the difficulty of its practice—draws me back from geographic inquiry to geographic disciplinarity. From the aspirational planetarity of McHarg, I come crashing back to earth, examining the discontinuance of

one of the 20th century's major centers of geographic inquiry. The previous chapters examined spatial metaphors for the integration of scientific knowledges in the service of ecological future-making. This chapter, by contrast, examines how the inadequacy of spatial metaphors for the integration of scientific knowledges have threatened the future of geographic inquiry. I examine a bridge collapse. The Michigan geography department's claim to serve as a bridge between natural- and social-scientific forms of knowledge was misaligned with its actually-existing practices; to some degree, this meant that the department could be evaluated negatively against the standards it articulated as it defended itself.

### 5.1 GOING CRITICAL

On the matter of self-defense: I'd like to close by reflecting on critical mapping. More specifically, on the 'critical' in critical mapping. And, forgive me, I do so by asking you to indulge me in another dalliance, this time into nuclear energy. To a nuclear scientist, to 'go critical' is to reach a threshold in an energetic chemical reaction. Once a nuclear reaction has 'gone critical,' it is self-sustaining and consistent. Criticality is a word for a particular form of equilibrium. A 'critical mass' of fissile material is a condition of 'just enough'—called a critical state—in which temperature and power remain constant. Criticality is a predictable friend that permits the technician to control their reactor. Nuclear power plants, with notably destructive exceptions, are reliably critical.

GIS and mapping have also gone critical, if not quite so reliably. Since the science wars and the corresponding GIS wars of the late 1980s and early 1990s,<sup>6</sup> GIS practitioners, critical human geographers, and others drawn to the affordances of mapping have maintained a

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<sup>6</sup>Wars that involved plenty of uncontrolled reactions! Cf. Nadine Schuurman, "Trouble in the Heartland: GIS and Its Critics in the 1990s," *Progress in Human Geography* 24, no. 4 (2000): 569–90, doi:10.1191/030913200100189111.



discomfiting truce. Making a casserole of practical efficacy, feminist positionality, and a broadly oppositional stance, GIS went critical!

But going critical, as we can learn from the specialist of fissile material, has multiple meanings. We who are tempted to claim the critical tradition might dust off our Foucault and feed our radical sensibilities with well-processed food, imported from Paris in 1968 and subsequently canned: “critique will be the art of voluntary inservitude or reflexive indocility.”<sup>7</sup> Sharing this meal with our chemist friend, though, we might find, to our surprise, that ‘going critical’ describes the delicate mechanical art of not being too explosive. Or we might prefer a dish native to the Marxist tradition, delighted by dour flavors as we dig in. They remind us of places we’ve been before: critique is the procedural unveiling of ideology and the diagnosis of capitalist world-disorders.<sup>8</sup> Critique is the cutting interpretation of social symbols,<sup>9</sup> with an eye to change them.<sup>10</sup> “Strange,” says the scientist... “I thought that the condition of criticality described exactly the art of not changing too much, lest we blow ourselves up.”

I’m playing games with words. I know. But I do think there’s something suggestive in thinking about ‘the critical’ with the nuclear scientist in mind, instead of the scowling continental philosopher. Can the insistence that we pursue the “art of not being governed” not begin to feel strangely similar to a governing maxim? What do we do when refusal and opposition prevent us from speaking about things that matter? In other words: are we, our-

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<sup>7</sup>Michel Foucault, “Of Other Spaces: Utopias and Heterotopias,” in *Rethinking Architecture: A Reader in Cultural Theory* (London, UK: Routledge, 1997), 32.

<sup>8</sup>Slavoj Žižek, “How Did Marx Invent the Symptom?” in *The Sublime Object of Ideology* (London, UK: Verso, 1989), 3–55.

<sup>9</sup>Frederic Jameson, “On Interpretation: Literature as a Socially Symbolic Act,” in *The Political Unconscious: Narrative as Socially Symbolic Act* (Ithaca, NY: Cornell University Press, 1981), 1–88.

<sup>10</sup>Karl Marx, “Theses on Feuerbach,” trans. Cyril Smith, 1845, <https://www.marxists.org/archive/marx/works/1845/theses/>.

selves, in danger of ‘going critical’ in the sense of the physicist? And this I think is what is so generative about mapping activity occurring outside of the disciplines that have traditionally served as its home. The subfields that we have called critical cartography and critical GIS have tended to be somewhat prescribed in their obsessions, though these have shifted alongside our discourse—declaring theoretical and historical war on the precepts and practices of modernist cartography, pulling back the curtain to reveal maps as power-full,<sup>11</sup> cultivating subjects as reflexive, techno-positional doers of GIS,<sup>12</sup> playing with epistemic tension,<sup>13</sup> and theorizing the encounter-filled courses that mappings chart through the world.<sup>14</sup> But in holding tightly to our descriptivist inclinations, we are only suspect of activities by which intervention is articulated. An example will illustrate the point.

Perhaps the most consistent linkage between cartographic knowledge and action takes place in work that rehearses the affair between the military-industrial-academic complex and GIS. Neil Smith is exemplary here; he famously begins his 1992 article in *Progress in Human Geography* by calling the Gulf War “the first full-scale GIS war”, in which geospatial tech contributed, directly and indirectly, to “the killing fields of the Iraqi desert.” GIS, in such military figurations, is a targeting mechanism deployed in the service of a military machine seeking to optimize its kill-to-killed ratio. “The Defense Mapping Agency and the National Oceanographic and Atmospheric Research Laboratory provided the ‘digital map data for the

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<sup>11</sup>Jeremy W. Crampton, *Mapping: A Critical Introduction to Cartography and GIS* (Malden, MA: Wiley-Blackwell, 2010); John Brian Harley, “Deconstructing the Map,” *Cartographica* 26, no. 2 (1989): 1–20, doi:10.3138/E635-7827-1757-9T53.

<sup>12</sup>Matthew W. Wilson, “Towards a Genealogy of Qualitative GIS,” in *Qualitative GIS*, ed. Meghan Cope (London, UK: SAGE, 2009), 156–70; Nadine Schuurman and Geraldine Pratt, “Care of the Subject: Feminism and Critiques of GIS,” *Gender, Place and Culture* 9, no. 3 (2002): 291–99, doi:10.1080/0966369022000003905.

<sup>13</sup>Matthew W. Wilson, “Cyborg Geographies: Towards Hybrid Epistemologies,” *Gender, Place & Culture* 16, no. 5 (2009): 499–516, doi:10.1080/09663690903148390; Michael Brown and Larry Knopp, “Queering the Map: The Productive Tensions of Colliding Epistemologies,” *Annals of the Association of American Geographers* 98, no. 1 (2008): 40–58, doi:10.1080/00045600701734042.

<sup>14</sup>Kitchin and Dodge, “Rethinking Maps.”

Desert Shield operating area' [...] the pilots slotted the resulting portable GIS [...] packages into cockpit computers, and the 'turkey-shoot', as a US general called it, was on."<sup>15</sup> Smith, concerning himself with matters of more concrete concern than those accompanying the problematics of representation, is concerned with the fact that the bloodthirsty machinery of American empire depends upon its mapping industries.<sup>16</sup>

I draw this example out to draw a distinction, the necessity of which was demonstrated to me by an experience in the early years of my doctoral training. I was discussing a prospective research project with a faculty member, a research project somewhat like this one—interested in maps, intervention, and design. In this conversation, I was unable to break through the monolithic impress that the only form of 'intervention' salient to geographical inquiry was wrought by military agents. While I heard my voice describing a project about landscape architecture, this faculty member reflected it back to me in the militaristic language of shock and awe. I certainly would not disagree that it is crucially important to continue centering those stories of military-industrial complicity. The 2009 debacle surrounding the so-called Bowman Expeditions has only reasserted the need for vigilance against military knowledge expropriation in indigenous communities.<sup>17</sup> But certainly it must be

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<sup>15</sup>Neil Smith, "History and Philosophy of Geography: Real Wars, Theory Wars," *Progress in Human Geography* 16, no. 2 (1992): 257–71, doi:10.1177/030913259201600208.

<sup>16</sup>On revisiting this essay, I was reminded that the section header that begins the paper is even more polemical—"GIS uber Alles". While spinning conspiratorial yarn between Nazi war effort and GIS technologies is not the sole province of Smith (see Trevor J. Barnes and Claudio Minca, "Nazi Spatial Theory: The Dark Geographies of Carl Schmitt and Walter Christaller," *Annals of the Association of American Geographers* 103, no. 3 (2013): 669–87, doi:10.1080/00045608.2011.653732; Mechtild Rössler, "Applied Geography and Area Research in Nazi Society: Central Place Theory and Planning, 1933 to 1945," *Environment and Planning D: Society and Space* 7, no. 4 (1989): 419–31, doi:10.1068/d070419; Keith C. Clarke and John G. Cloud, "On the Origins of Analytical Cartography," *Cartography and Geographic Information Science* 27, no. 3 (2000): 195–204, doi:10.1559/152304000783547821) this is the only instance I'm aware of in which a sort of critical-kitsch version of Godwin's Rule of Hitler Analogies gives way to a direct analogy-by-substitution between 'GIS' and the Third Reich.

<sup>17</sup>Joel Wainwright, *Geopiracy: Oaxaca, Militant Imperialism, and Geographical Thought* (New York, NY: Palgrave Macmillan, 2013).

admissible to suggest that questions of militarism and questions of landscape design and urban planning are not *always-and-everywhere* identical, though they can certainly share logics,<sup>18</sup> projects,<sup>19</sup> and professional circuitry.<sup>20</sup>

Geographers can do better than to tacitly, or explicitly, suggest that any mapper who seeks to draw a line, to make a difference, to intervene is dining at a shared table with the instruments of imperial rule. Surely, geographers can do better. Think towards action. Know towards difference. Draw in the direction of new worlds. And this requires a substantially different relationship to representation, one that we might reinforce with reference to the texts and histories of the design traditions.

## 5.2 GRAPHE

In a 1986 essay entitled “Translations from drawing to building”, Robin Evans outlines a theory of representational directionality that is unusually attuned to the feeling that the work done by such propositional drawing is, indeed, work: it involves sweat, slippage, imperfections, breakages, and even total exhaustion.<sup>21</sup>

Evans writes, specifically, on architectural drawing, starting from a comparison between representational painting and architectural drawing, noting that painters found their subjects *out there*: in nature, in the world, already existing to be captured by their brush strokes. The object exists before the painting, and will continue to exist after it. It is here that critical cartographers have invested much of their effort noting that in maps, like in paintings, we can observe power plays: that the object of the painting is in some sense produced and repro-

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<sup>18</sup>Mike Davis, “Fortress Los Angeles: The Militarization of Urban Space,” in *Variations on a Theme Park*, ed. Michael Sorkin (New York, NY: Macmillan, 1992), 154–80.

<sup>19</sup>Eyal Weizman, *Hollow Land: Israel's Architecture of Occupation* (London, UK: Verso, 2012).

<sup>20</sup>Light, *From Warfare to Welfare: Defense Intellectuals and Urban Problems in Cold War America*.

<sup>21</sup>Zulaikha Ayub introduced me to this piece.

duced by the act of painting; that the painting serves as a veil for the subterfuge of ideological machination; that the painting embodies a scopic regime implying an act of masculinist capture; that the painting is one element in a discursive apparatus that carves a certain kind of subject from the human flesh. Maps are like paintings. Paintings are like maps. Purportedly representational, actually powerful.

As an architect, though, Evans is dissatisfied with this repertoire of analytical moves. Robins notes that in architectural drawing, the “subject-matter (the building or space) will exist *after* the drawing, not before it”, which he calls “reverse directionality”

Drawing in architecture is not done after nature, but prior to construction; it is not so much produced by reflection on the reality outside the drawing, as productive of a reality that will end up outside the drawing. The logic of classical realism is stood on its head, and it is through this inversion that architectural drawing has obtained an enormous and largely unacknowledged generative power: by stealth.

It is therefore both a disadvantage and an affordance that architects can only labor on their objects through an intervening medium; intervening in the sense of all technique (in which the drafting table or CAD drawing sits between the representation and the represented); but also temporally (the representation sits before and not after the represented). For Robins, this suggests a different methodological orientation; we should not focus on representational concerns—‘style or signification’, as he puts it—but on work practices, which are always directly or indirectly confronting “the gap between drawing and building.”<sup>22</sup>

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<sup>22</sup>Evans, “Translations to Drawing to Building.”

It is true that critical cartography has latterly considered ‘situated pragmatics’ an essential theoretical insight. But this has been a pragmatics more attuned to the work a map does, almost in spite of itself, than attuned to the work a map, a drawing, a plan, sets out to do and ultimately can only do imperfectly.

Said differently, I propose that a return to the promise of ‘graphie’. We are one of the few disciplines that benefits from this ambiguous suffix. In the Greek, it means the process of writing, drawing, sketching, or painting, all techniques which can be applied in strictly representational ways, or in manners generative and propositional. Where ‘-ology’ implies logos, logic, formalization, and study, we are left with a range of potential practices suggestively wider than our other counterparts in the sciences. We might focus on drawing, responsibly, rather than mapping, descriptively. Even as we assemble knowledges—imagined in stacks of layers, spheroidal globes, or spanning bridges—we also have a responsibility for the worlds they suggest and the proposals they make, with or without our permission.

### 5.3 CODA

I put the finishing touches on this chapter as fires rage in Australia; yesterday, January 12, 2020 it was 72 degrees Fahrenheit outside my home in Somerville, Massachusetts, breaking 70 in January for only the fourth time since records began in the mid-19th century. I leave it to the reader to incant their own psalm of climatic realities.

I raise the spectre of the climate crisis in order to elevate my own ambivalence. It was not so long ago—a matter of decades—that the particular form of epistemic nervousness I analyzed above was diagnosed in order to propose radical contingency as a salve and balm. “Aha,” said the skeptics, “knowing is a power play. The path forward for radical thought

must be to destabilize claims to authority and to denaturalize these acts of arbitrary legal force.” In so doing, the horizons for political thought would be expanded, the stultifying consensus that puts an end to political life would be replaced with a dissensus that moves, and mid-century attempts to supplant politics with informed decisions would come to an end.

My summary of the post-structural wing of radical thought is no doubt reductive. But I follow e.g., Rita Felski,<sup>23</sup> Eve Sedgwick,<sup>24</sup> Bruno Latour,<sup>25</sup> Jeff Pruchnik,<sup>26</sup> and Donna Haraway<sup>27</sup> in understanding this set of moves as inadequate and far from intrinsically progressive. As the discourse around climate crisis shifts and the key culprits evade and escape responsibility, it is truly deflating to see precisely the argumentation proffered as libratory by large sections of the academic left deployed by right-wing bodyguards of the extractive industries. “Destabilize claims to knowledge, revealing the workings of power and capital” has long been the mantra of the left. How strange to see it also become the mantra of the right, at least insofar as the reality of the climate crisis is concerned.<sup>28</sup> In theorizing ‘ought anxiety’, I do not damn the patient. Rather, I seek to understand forms of evidence that are so often the basis for response, even as I elevate the sufficiency of partial knowledge as a tincture. In doing so, I hope to make my small contribution to disarming the appeal to ‘more research is needed’, at least in the domain of ecopolitics.

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<sup>23</sup> *The Limits of Critique*.

<sup>24</sup> “Paranoid Reading and Reparative Reading, or, You’re so Paranoid, You Probably Think This Introduction Is About You”; *Shame and Its Sisters: A Silvan Tomkins Reader*, ed. Eve Kosofsky Sedgwick and Adam Frank (Durham, NC: Duke University Press, 1995).

<sup>25</sup> “Why Has Critique Run Out of Steam? From Matters of Fact to Matters of Concern.”

<sup>26</sup> “Postcritical Theory?: Demanding the Possible.”

<sup>27</sup> “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective.”

<sup>28</sup> Naomi Oreskes and Erik Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (New York, NY: Bloomsbury, 2011).

## APPENDIX A: METHODOLOGY

This research project began with a month-long stay in the McHarg Archives at the University of Pennsylvania in June-July 2015. I had a simple question when I descended the small exterior staircase leading to the Architectural Archives, which sits in the basement of UPenn's Fisher Fine Arts Building. Namely: how was it that a landscape architect and ecological planner—Ian McHarg—had become so strongly associated with GIS. I had read histories and retrospectives that elevated McHarg to a position of methodological prominence; Nadin Schuuman, Denis Cosgrove, Jack Dangermond, and others did this. Yet, I had also read *Design With Nature*—while, absolutely, McHarg presented a method using overlays, he was far from the first to do so. This fact was well-documented in existing literature and the evidence has only thickened in the intervening years.

However, the misalignment between inherited origin story and empirical fact did not suggest to me that to pursue McHarg's relationship to GIS was a dead-end. In fact, it suggested the opposite: given that McHarg did not 'invent' the overlay paradigm, let alone GIS, how was it that he became so central to the discourse of GIScientists? How was it that this myth became so ensconced that even historically-attuned members of the community accepted McHarg's progeny?

I answered this question, factually, on my first day in the archive. Dusting off conference proceedings and correspondence from the late 1970s on, I found traces of McHarg's



latter activities, including a spatial database consultancy, founded by former students and colleagues, called Expert Information Systems (EIS); I found evidence of his attempts to introduce computation into his pedagogy in collaboration with geographers and computer scientists; I noted the way that McHarg consistently conflated these categories of practitioner—geographer, computer scientist, geographer/computer scientist—in a manner I had never seen elsewhere. Folder title after folder title contained references to ‘GIS’ and ‘Geographic Information Systems.’ McHarg became influential in GIS because, for a largely-forgotten decade in his late life, he attempted to reshape himself into and sell himself as a GIScientist. The fact that he largely failed, professionally, while succeeding, discursively, is a great paradox. It was this rub—between McHarg’s many failures to computerize his practice and the success of his campaign for recognition—that drove me to investigate the history of what I term ‘epistemic aesthetics’ in his archive and others. Indeed, the misalignment drove me to think about GIS and mapping within the design disciplines as *rhetorical*, as opposed to *methodological*; it drove me to think about the role of aesthetics in inquiry and ensuring the efficacy of the same.

Such an approach, straddling the successes and failures of a life lived, pulls against the general orientation of the archive. As Lorimer and Philo suggest, archives often do much to mask “‘cracks’ in the facade: for misunderstandings, for other questions needing to be asked that the sources, in their neatness and completeness, arguably evade.”<sup>29</sup> In stitching together oral histories and archival sources, I do not argue that I have found my way to a novel means of speaking against the archive, or of elevating those on its margins; I write of major figures

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<sup>29</sup>“Disorderly Archives and Orderly Accounts: Reflections on the Occasion of Glasgow’s Geographical Centenary,” *Scottish Geographical Journal* 125, nos. 3-4 (2009): 229, doi:10.1080/14702540903364278.

speaking, writing, and living within centered identities. However, I follow archival threads that lead to minor episodes and unremarkable trajectories; plans that never materialized, quixotic notions, approaches that fell out of favor, departments that closed. Indeed, if I have a historiographic contribution, it is to suggest what I call a ‘breakdown historiography’—a focus on historical episodes that shine light on how things fall apart and don’t work out, and under which conditions. How did the Michigan department falter and fail? How did McHarg’s cartographic rhetoric prove inadequate to ensure material change?

Here, I attempt to document a methodology that emerged very much in-process, while placing it in conversation with newly vigorous discussions around methodology among historians of geography. It is true that geographers have become quite lax in their methodological documentation. Lorimer, for example, points that that geographers have “seldom gone in for instrumental descriptions of archival method, or, ethical reflections upon archival conduct or the founding epistemic principles and schema underlying the nature of their practice.”<sup>30</sup> Dydia Delyser and Bethany Rogers note that a truly distressing 1% of articles between 2000 and 2007 contained a ‘methods’ section.<sup>31</sup> This is to our detriment.

#### TANTALIZING HINTS OF FAILURE

The archive is not a place one visits when ‘failures’ are the object of inquiry. Much ink, in fact, has been spilled on the role of archives in establishing order and constructing the classificatory schema upon which master narratives rest. In the humanistic wings of the social

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<sup>30</sup>Hayden Lorimer, “Caught in the Nick of Time: Archives and Fieldwork,” in *The SAGE Handbook of Qualitative Geography*, ed. Dydia DeLyser et al. (London, UK: SAGE, 2010), 4, doi:10.4135/9780857021090.n16; Richard H. Schein, “Re-Placing the Past?” *Historical Geography* 29 (2001): 7–13, <https://ejournals.unm.edu/index.php/historicalgeography/article/view/2988/2465> makes a similar point.

<sup>31</sup>Dydia DeLyser and Bethany Rogers, “Meaning and Methods in Cultural Geography: Practicing the Scholarship of Teaching,” *Cultural Geographies* 17, no. 2 (2010): 185–90, doi:10.1177/1474474010363847.

sciences and the humanities, proper, much archival scholarship has followed the genealogical interventions of Michel Foucault's *The Archaeology of Knowledge*<sup>32</sup> and the deconstructive heat of Jacques Derrida's *Archive Fever*.<sup>33</sup> While these two are too often collapsed into a generic post-structural *oeuvre*,<sup>34</sup> their points are broadly similar: that an archive is not only a collection, an accretion, or a repository. Instead, to 'archive' is a verb. For Derrida, this suggests that to archive is to grant legitimacy to a channel dug between the private and the public. Similarly, for Foucault, an archive is a site of composition in which regularities are constructed through the grouping and culling of documents and artifacts. These interventions point to the role of archival practice in creating the conditions for governance and establishing authority through documentary means.

Following this line of argumentation that outlines a theory of the 'archival state,' broadly construed, many have methodologically emphasized absences in the archive. What voices are centered through archival repositories? Francesca Moore, for example, draws our questions of archival ethics and archival partiality.<sup>35</sup> Many times when we confront an archival absence that feels redolent of suppression or censorship, we may actually be encountering anonymization and veiling practices—silences can be borne of both suppression and care. Indeed, in such a case, an archive is acting to not only curate its chorus—which voices are present—but is also acting to control narratives and classifications. In other words, archives claim a legitimate monopoly on interpretive power. For this reason, Osborne calls the

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<sup>32</sup>*The Archaeology of Knowledge*, trans. A. M. Sheridan Smith (New York, NY: Pantheon Books, 1972).

<sup>33</sup>*Archive Fever: A Freudian Impression* (Chicago, IL: University of Chicago Press, 1996).

<sup>34</sup>See Crampton, *Mapping: A Critical Introduction to Cartography and GIS* on Brian Harley's "Deconstructing the Map", for instance.

<sup>35</sup>Francesca P. L. Moore, "Tales from the Archive: Methodological and Ethical Issues in Historical Geography Research," *Area* 42, no. 3 (2010): 262–70, doi:10.1111/j.1475-4762.2009.00923.x.

archive a *centre of interpretation*,<sup>36</sup> drawing on Latour's well-known writings around 'centers of calculation.'<sup>37</sup>

The absences I pursued were not, precisely, the voices of the marginalized, or some kind of counter-history 'from below'. While these have often been usefully explicated by archival and para-archival research, I was looking for minor stories about major figures. In the case of Michigan, this was well-documented in some ways; if it is nothing else, Universities and their committees are excellent generators of self-documenting paperwork. What was harder to find were stories, sentiments, the events and happenings that sat in the edges of the frame and grounded it. What was the life of the department at the time of its closure? Very simply, what are the affective realities of having the necessity of your discipline called into question? Beyond this questions of lived experience, the archive was constructed by a University that has a vested interest in legitimating its own decision. We turned to oral histories to hear other stories, which we substantiated elsewhere.

In the case of McHarg, the silences were projects and initiatives that produced thin paper trails. I was specifically looking for these: projects that experienced mixed success. As such, the archive only dropped tantalizing hints of failure: a business plan. An unfunded proposal. I sought oral historical corroboration and explication from friends, colleagues, and collaborators who would have been most intimately acquainted with McHarg's professional life. I also built outward from the McHarg Collection at Penn. Though less of the material than I hoped found its way into the final dissertation, I consulted the American Archive of Public Broadcasting, WGBH, Boston, Massachusetts, in search of the only existing record-

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<sup>36</sup>Thomas Osborne, "The Ordinarity of the Archive," *History of the Human Sciences* 12, no. 2 (1999): 52, doi:10.1177/09526959922120243.

<sup>37</sup>Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge, MA: Harvard University Press, 1987).

ings of McHarg's *House We Live In* television series. I consulted the Rockefeller Foundation Archives looking for documentation of McHarg's involvement in conservation efforts before *Design With Nature*. But these archival trips tended to reinforce and substantiate the broad category of professional successes that contextualize the smaller stories I attempted to elaborate.

#### ARCHIVAL MAGNITUDE

Even as these silences and exclusions are a basic part of archival work, I couldn't help but note how poorly these implied thinnesses aligned with the actual experience of doing archival work. There is a paradoxical simultaneity at play between archival absences—letters referenced but not present, silenced voices, missing pages, torn photos—and the enormous abundance of documents that present themselves on entry to a specific archival site.<sup>38</sup> Steedman draws this paucity and plenty together noting that “in actual archives, though the bundles may be mountainous, there isn't in fact, very much there. The archive is not potentially made up of everything ... and it is not the fathomless and timeless place in which nothing goes away. The Archive is made from selected and consciously chosen documentation from the past *and* from the mad fragmentations that no one intended to preserve and that just ended up there.”<sup>39</sup> Indeed, there is a reason that scholars have described the arrival of numerate bureaucracy as an ‘avalanche’<sup>40</sup>.

Scholars have recently exhibited a tendency to understand abundance as a quality of ma-

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<sup>38</sup>Cheryl McGeachan, Isla Forsyth, and William Hasty, “Certain Subjects? Working with Biography and Life-Writing in Historical Geography,” *Historical Geography* 40 (2012): 165–85, <https://ejournals.unm.edu/index.php/historicalgeography/article/view/1347/>.

<sup>39</sup>Carolyn Steedman, “The Space of Memory: In an Archive,” *History of the Human Sciences* 11, no. 4 (1998): 67, doi:10.1177/095269519801100405.

<sup>40</sup>Ian Hacking, “Biopower and the Avalanche of Printed Numbers,” in *Biopower: Foucault and Beyond*, ed. Vernon W. Cisneros and Nicolae Morar (Chicago, IL: University of Chicago Press, 2015), 65–81.

terials born digital. Roy Rosenzweig, for instance argues that there is an archival paradigm shift underway “from a culture of scarcity from a culture of abundance.”<sup>41</sup> While there is certainly a quantitative change underway, it is arguable whether it is accompanied by a qualitative change. Discourses swirling around “big data” are often wilfully presentist; “big data” are imbued with “little history’ as Trevor Barnes put it a number of years ago.<sup>42</sup> Lest we forget, mass-reproduction of paper reports ensured that paper was a knowledge-technology of abundance as well.<sup>43</sup> All archival projects since the late 19th century have to some degree been forced to confront a “dense administrative circuitry of hundreds of thousands of pages of reports, minutes, and press releases”.<sup>44</sup>

Indeed, while I certainly culled, selected, and strategized in the midst of my archival visits, I did not make detailed notes. I only jotted down a phrase here and there when I noted a possible new line of inquiry. Interpretation, story-making and story-telling... these were retroactive tasks, conducted using primary materials I successfully vacuumed in the course of archival visits. Instead of making extensive notes at night following archival visits, I spent hours grouping digital images into a personal reconstruction of archives, replicating their folder and box structure (fig. A.1). I am led to wonder what the new mediated portability of archival materials does for the researcher. Certainly, I found myself bogged down in empirical detail more than once, and my chapters, I am quite sure, remain somewhat overfull of dates, names, and titles that would have been forgotten or ignored given the constraints

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<sup>41</sup>“Scarcity or Abundance? Preserving the Past in a Digital Era,” *The American Historical Review* 108, no. 3 (2003): 735–62, doi:10.1086/ahr/108.3.735.

<sup>42</sup>Trevor J. Barnes, “Big Data, Little History,” *Dialogues in Human Geography* 3, no. 3 (2013): 297–302, doi:10.1177/2043820613514323.

<sup>43</sup>Lisa Gitelman, *Paper Knowledge: Toward a Media History of Documents* (Durham, NC: Duke University Press, 2014).

<sup>44</sup>Jake Hodder, “On Absence and Abundance: Biography as Method in Archival Research,” *Area* 49, no. 4 (2017): 452–59, doi:10.1111/area.12329.

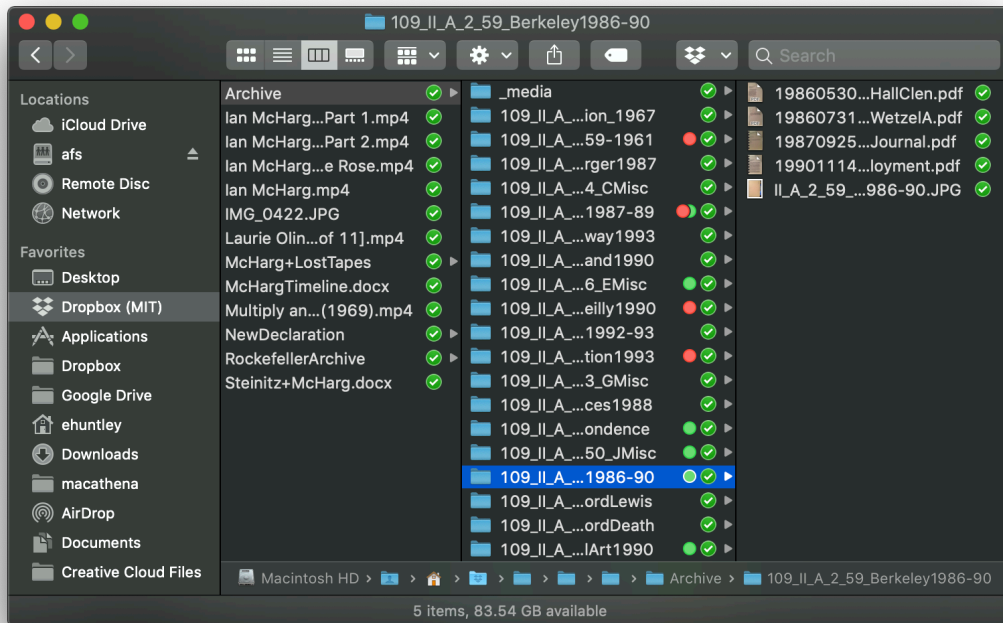


Figure A.1: The author's personal reconstruction of the McHarg archive.

of past archival inquiry. The absences in the archive much-discussed by scholars are, of course, often colonial; but I do wonder how often the emphasis on paucity is a melancholy affect effected by the conclusion of a research experience in which scholars couldn't take the treasured documents home with them.

Particularly in the case of the chapters on McHarg, the chapters take on a decidedly biographical tone. This was not my intention; I never intended to be a biographer of McHarg. To the extent that I did, it was my route through archival abundance. I point for example to Hodder's elevation of biography as a salve for the historian overwhelmed by the breadth of their subject. Biography is not only to know a life well, but also to understand what the life says about the sociocultural context that shaped a life. Hodder suggests that a biography is

not only a subject, but a method.<sup>45</sup> This implies a “kind of biographical work biographical work [...] less concerned with knowing a life *per se* than how those experiences can cast light on the wider social and cultural worlds that a life inhabits.”<sup>46</sup> In the case of both Michigan and McHarg, the social and cultural worlds inhabited by the lives at the center of my story were academic. Navalgazing, says the critic! While I am likely guilty of a certain degree of academic chauvinism, I also take seriously the need to study of academic departments. As Withers suggests, such study is necessary to truly understand the sociology of knowledge production, in general, and to understand the department as a site of knowledge-making, specifically.<sup>47</sup> As many have insisted, the making of geographic knowledge is a placed activity;<sup>48</sup> when the place of its making is an academic department, well, so be it.

#### ORAL HISTORIES

I augmented archival visits with oral histories, while realizing that oral history is not an approach that has stimulated a great deal of interest in human geography. This is perhaps most concisely illustrated by the fact that the *SAGE Handbook of Qualitative Geography* has a section on “Life History Interviewing”—a subset of oral historical methods—but not on oral history.<sup>49</sup> Even more strikingly, even where substantial oral history archives *have* been constructed, these resources are not often consulted. Take as an example the Distinguished Geographer Film Interview Series (DGFIS). Maynard Weston Dow and Preston

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<sup>45</sup>One geographers have used to great effect, as in, for example, Neil Smith, *American Empire: Roosevelt's Geographer and the Prelude to Globalization* (Berkeley, CA: University of California Press, 2003).

<sup>46</sup>Hodder, “On Absence and Abundance: Biography as Method in Archival Research,” 453.

<sup>47</sup>Charles W. J. Withers, “Constructing ‘the Geographical Archive,’” *Area* 34, no. 3 (2002): 303–11, doi:10.1111/1475-4762.00084.

<sup>48</sup>Barnes, “Placing Ideas: Genius Loci, Heterotopia and Geography's Quantitative Revolution”; David N. Livingstone, *Putting Science in Its Place: Geographies of Scientific Knowledge* (Chicago, IL: University of Chicago Press, 2003).

<sup>49</sup>Peter Jackson and Polly Russell, “Life History Interviewing,” in *The SAGE Handbook of Qualitative Geography*, ed. Dydia DeLyser et al. (London, UK: SAGE, 2010), 172–92, doi:10.4135/9780857021090.n12.



James launched what would become the DGFIS at the 1970 Annual Meeting of the Association of American Geographers in San Francisco. Beginning with Carl Sauer, this series rapidly expanded; by 1974, the interviews numbered fifty-seven and could expect the support of the \$9,820 from the National Science Foundation.<sup>50</sup> Yet, this series appears nowhere in recent reassessments, including a 2007 assessment by Mark Riley and David Harvey.<sup>51</sup>

This, of course, may change: the films have been transferred to the Library of Congress, with the AAG acting as co-curator with the library. Still, the facts on the ground are consistent with what has been often noted of geographers—that while interest in reflexivity is broad, interest in history is narrow. We appear to embody a contradictory situation in which reflecting on our history as a colonial enterprise and as a research wing of the nation state has obviated sustained attention to the inquiry and inquirers who constituted the discipline. Barnes draws a parallel between geographers and Henry Ford, who said “we want to live in the present, and the only history that is worth a tinker’s damn is the history we make today.”<sup>52</sup> This has made remembering the past of geographic inquiry a rather difficult procedure. The contributions of those figures whose biographies trace its contours vanish rather quickly from syllabi and from conversation.

In turning to oral histories, I was generally seeking to track down personal stories that might extend, complicate, or contradict narratives imprinted in the archive or in published literature. It was often the case, in researching the McHarg chapters, that I would share

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<sup>50</sup>Maynard Weston Dow, “The Oral History of Geography,” *The Professional Geographer* 26, no. 4 (1974): 430–35, doi:10.1111/j.0033-0124.1974.00430.x; Maynard Weston Dow, “Interviews with New England Geographers,” in *Geography in New England* (New Britain, CT: New England Geographical Society, 1988), 64–117.

<sup>51</sup>Mark Riley and David Harvey, “Talking Geography: On Oral History and the Practice of Geography,” *Social & Cultural Geography* 8, no. 3 (2007): 345–51, doi:10.1080/14649360701488765.

<sup>52</sup>Trevor J. Barnes, “Notes from the Underground: Why the History of Economic Geography Matters (Reopke Lecture in Economic Geography),” *Economic Geography* 88, no. 1 (2012): 2, doi:10.1111/j.1944-8287.2011.01140.x.

a story that I had found in McHarg's writings or letter and receive a dismissive guffaw in response. It's well-recognized that McHarg was a gratuitous exaggerator of his own successes and influence. This is documented elsewhere in this dissertation. In turning to oral histories, I sought to both corroborate thin evidence and counteract inflated evidence. My goal, in these oral histories, was not to establish a single authoritative account, but to locate further intersubjective, interpretive disagreements that were ultimately the stimulus to this project.

Indeed, this is one of the strengths of oral history as a method—a strength which is too often discussed as a weakness. The method is treated with suspicion by historians and many social scientists for reasons of verifiability. Memory, certainly, is fallible and subject to personal bias and selective recollection.<sup>53</sup> This very personal subjectivity, though, provides clues about divergent interpretations of historical events and how the “past is located in [the interviewee's] present.”<sup>54</sup>

In this way, my path towards oral history was the inverse of that taken by Trevor Barnes; he begins by sitting with geographers, finding the partiality of their stories, and taking to the archives in search of corroboration and the beginnings that are understandably glossed by figures telling the story they are in the midst of living. I began in the archive, finding tantalizing traces, and placing them before others close to the events, asking for their useful *guffaws* and alternative interpretations of the same story.

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<sup>53</sup>Jackson and Russell, “Life History Interviewing”; Riley and Harvey, “Talking Geography: On Oral History and the Practice of Geography.”

<sup>54</sup>Gavin J. Andrews et al., “‘Their Finest Hour’: Older People, Oral Histories, and the Historical Geography of Social Life,” *Social & Cultural Geography* 7, no. 2 (2006): 157, doi:10.1080/14649360600600338; Riley and Harvey, “Talking Geography: On Oral History and the Practice of Geography”; Ashley R. Ward, “Reclaiming Place Through Remembrance: Using Oral Histories in Geographic Research,” *Historical Geography* 40 (2012): 133–45, <https://ejournals.unm.edu/index.php/historicalgeography/article/view/1348/>.

## ARCHIVES CONSULTED

- American Archive of Public Broadcasting, WGBH, Boston, Massachusetts.
- Archival Collections at GSD, Frances Loeb Library's Special Collections, Graduate School of Design, Harvard University. Cambridge, Massachusetts.
- Bentley Historical Library, University of Michigan, Ann Arbor, Michigan.
- Ian L. McHarg Collection, Architectural Archives, Weitzman School, University of Pennsylvania. Philadelphia, Pennsylvania.
- Ford Foundation Collections, Rockefeller Archive Center, Sleepy Hollow, New York.
- MIT Special Collections, Massachusetts Institute of Technology. Cambridge, Massachusetts.

## ORAL HISTORIES CONDUCTED

- Anne Whiston Spirn. Interview conducted on June 7, 2019 at the Massachusetts Institute of Technology.
- Carl Steinitz. Interview conducted on May 18, 2017 via Skype.
- Dana Tomlin. Interview conducted on January 12, 2018 at BirchTree Bread Company in Worcester, Massachusetts.
- John Radke. Interview conducted on March 31, 2016 in the lobby of the downtown San Francisco Marriott during the annual meeting of the Association of American Geographers.
- Ann Larimore. Interview conducted with Matthew Rosenblum on December 14, 2016 at Mighty Good Coffee on Main Street in Ann Arbor, Michigan.
- John Nystuen. Interview conducted with Matthew Rosenblum on December 16, 2016

at John Nystuen's home in Ann Arbor, MI.

## APPENDIX B: AUTHORSHIP OF CHAPTER THREE

The third chapter of this dissertation, titled “The Omega Affair”, is based on research that I conducted with the help of my colleague Matthew Rosenblum at the University of Michigan’s Bentley Historical Archives in Ann Arbor, Michigan. We also conducted oral history interviews with faculty members active in the department at the time of its closure. The paper will be published as a co-authored paper; it has recently been accepted for publication in the *Annals of the American Association of Geographers*.

However, I was the lead author, organized, planned, and transcribed all interviews, and had final responsibility for all drafts. I also conducted substantial supplementary research in archived back issues of the *Michigan Daily* and *Ann Arbor Chronicle* newspapers, as well as *Michigan Alumnus* magazine. Finally, I am solely responsible for all revisions to the paper made in response to the feedback two very generous anonymous reviewers. I resubmitted the essay to the *Annals of the American Association of Geographers* on 5 January 2020; I made further (minor) revisions and resubmitted on 12 February 2020.

Matthew Rosenblum contributed to research at the Bentley Historical Library and conducted interviews with me. He also contributed to writing the first draft of our analysis, placing our story of discontinuance within the longer arc of academic geography’s institutionalization.

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## VITA

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#### Education

- 2014, M. Urban and Regional Planning, University of Michigan, Ann Arbor, MI.
- 2010, B. Fine Arts, Performing Arts Technology, University of Michigan, Ann Arbor, MI.
- 2016, Graduate Certificate in Social Theory, University of Kentucky, Lexington, KY.

#### Professional Positions Held

- 2019–, Lecturer in Urban Science and Planning, Massachusetts Institute of Technology, Cambridge, MA.
- 2017–2019, Technical Instructor of GIS, Data Visualization, and Graphics, Massachusetts Institute of Technology, Cambridge, MA.

#### Awards and Professional Honors

- 2020, New England Regional Fellowship Consortium (NERFC) Research Fellowship (\$5,000 USD).
- 2019, Antipode Foundation Scholar-Activist Award (with Graphe and the Mining Injustice Solidarity Network, \$17,000 CAD).
- 2018, MIT Open Learning Teaching with Digital Technology Award.
- 2018, MIT Humanities, Arts and Social Sciences (HASS) Award (\$15,000 USD).
- 2017, University of Kentucky Department of Geography Outstanding Geography Teaching Assistant Award.
- 2017, Barnhart-Withington Research Grant (\$1,450 USD).
- 2015, Barnhart-Withington Research Grant (\$1,027 USD).

#### Professional Publications

- Forthcoming, Eric Robsky Huntley and Matthew Rosenblum. “The Omega Affair: The Discontinuance of the University of Michigan Department of Geography, 1977-1982.” *Annals of the American Association of Geographers*.

- 2020, Nancy Krieger, Emily Wright, Jarvis T. Chen, Pamela D. Waterman, Eric Robsky Huntley, and Mariana Arcaya. “Cancer stage at diagnosis, historical redlining, and current neighborhood characteristics: Breast, cervical, lung, and colorectal cancer, Massachusetts, 2001-2015.” *American Journal of Epidemiology*. doi:10.1093/aje/kwaa045.
- 2017, Jeremy W. Crampton, Eric Robsky Huntley, and Emily C. Kaufman. “Societal Impacts and Ethics of GIS.” In *Reference Module in Earth Systems and Environmental Sciences*, edited by Thomas J. Cova and Ming-Hsiang Tsou. Oxford: Elsevier. doi:10.1016/B978-0-12-409548-9.09628-7.
- 2014, Eric Robsky Huntley and Robert Cabral. “Embracing the Impermanent: Deconstruction, Metabolism, Memory.” In *Historic Preservation and Urban Change*, edited by Terry Schwarz. Vol. 7 of *Urban Infill*, 78-83. Cleveland: Cleveland Urban Design Collaborative.