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**Transforming the Central Valley:  
Body, Identity, and Environment in California, 1850-1970**

by  
Linda Lorraine Nash

A dissertation submitted in partial fulfillment of the  
requirements for the degree of

Doctor of Philosophy

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2000

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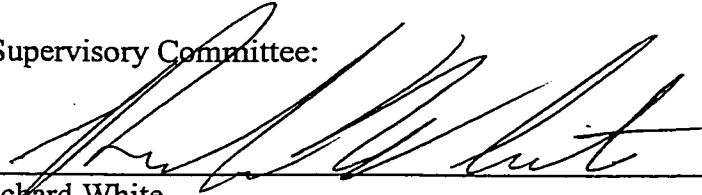
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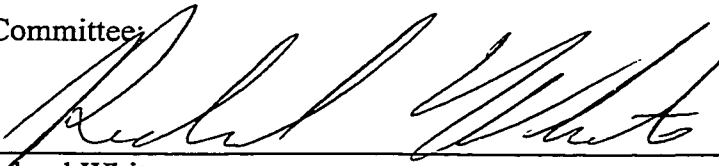
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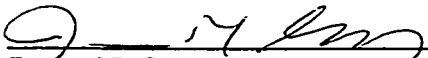
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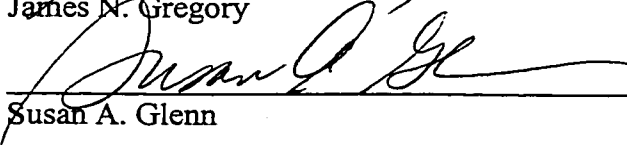
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Abstract

**Transforming the Central Valley:  
Body, Identity, and Environment in California, 1850-1970**

Linda Lorraine Nash

Chairperson of the Supervisory Committee:  
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In this dissertation, I provide a cultural history of environmental change in California's Central Valley. Complicating the assumption that projects of environmental transformation have proceeded from the belief on the part of European-Americans that human beings were separate and distinct from the non-human world, I focus on the perceived relationships among human bodies, the natural environment, and Anglo-American identity over little more than a century. In the nineteenth century, as Anglo-Americans sought to colonize the Central Valley and displace its former occupants, they looked to the natural environment both to foreshadow and to legitimate their own success. In that world, most believed that the environment could directly shape human beings in both physical and moral ways. In the first three chapters, I describe nineteenth-century concerns over travel, agricultural labor, and the problem of miasma and disease -- focusing in each case on how concerns about the human body influenced environmental

understandings, and on the Anglo-American belief that the environment called for and required human beings to complete and to "finish" the landscape that they encountered.

Turning to the twentieth century, I examine how these understandings were recast as modern technology and engineering professionals increasingly mediated human relationships with the environment. I describe the two major engineering projects undertaken in the valley -- the construction of the Central Valley Project, a stupendous effort to reorganize the valley's hydrology in the interest of irrigation in the 1930s and 40s, and the construction of a modern freeway system between roughly 1945 and 1970. In these chapters, I pay particular attention to the ways in which these large-scale environmental transformations were bound up with concerns over the place of vulnerable human bodies in a natural-technological world. I argue that, from a cultural standpoint, works of modern engineering represented an attempt to reveal the underlying order of the nature through the application of technology on the one hand, and to harmonize human bodies with the modern environment on the other. In this sense, twentieth-century engineers both invoked and rewrote the nineteenth-century discourse of environmental finishing.

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In addition, I would like to acknowledge the support of the UW Graduate School, the Huntington Library, and the Walter Chapin Simpson Center for the Humanities. Of these institutions, the latter two provided not only financial support, but also a community of engaged scholars with whom to share my work.

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commitment to his students, from which I and many others continue to benefit. The debt here I fear is lifelong. Likewise Jim Gregory and Susan Glenn are not merely outstanding scholars and exceptional teachers, but thoughtful and committed mentors. I am privileged now to call them my colleagues. With such a committee, the inadequacies remaining in the dissertation are all too clearly my own.

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### *Introduction*

The Central Valley is a landscape in which human beings are deeply implicated, a region that has been so radically altered by human actions over the last century and a half that in most places it bears little resemblance to what it was in the mid nineteenth century. As a result, for many contemporary observers and particularly for environmentalists, the valley has become something of a symbol of technological hubris and the environmental and social costs of American modernity. As the story goes, a landscape once filled with unique environments, abundant wildlife, and incontrovertible beauty has been replaced by mono-crop agriculture and suburban sprawl; it is now well known for its large dams, pesticide pollution, and its corresponding inability to sustain either wild salmon, waterfowl populations, or native vegetation.

Although there are many histories of the valley, both environmental and social, they have overwhelmingly shared an emphasis on the role of industrial agriculture in shaping the region. These narratives have identified the rise of large-scale corporate farming, in collaboration with federal and state governments that have favored centralized control and the rights of employers, as responsible for a history of both

environmental degradation and social inequality in the region.<sup>1</sup> Both the imperatives of capital and the sheer power of the modern state have indeed shaped the valley, influencing the crops that are grown, the location of rivers and roads, the species that are favored, and the people who live and work within the region. The rise of corporate agriculture and large bureaucracies unquestionably remains a powerful and compelling narrative that is critical to understanding the history of not only California but much of the western United States. It is a story that I do not want to dismiss or displace in writing a different history of the valley. But it is so powerful that it has obscured other narratives, equally true, about this place. As other historians have argued, the massive

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<sup>1</sup> The classic source of this narrative is, of course, Carey McWilliams, *Factories in the Field: The Story of Migratory Farm Labor in California* (Boston: Little, Brown, and Company, 1939). Other sources that elaborate this theme in different ways include Walter Goldschmidt, *As You Sow* (New York: Harcourt, Brace, and Company, 1947); Arthur Maass and Raymond L. Anderson, *...And the Desert Shall Rejoice: Conflict, Growth, and Justice in Arid Environments* (Cambridge, MA: MIT Press, 1978); Don Mitchell, *The Lie of the Land: Migrant Workers and the California Landscape* (Minneapolis: University of Minnesota Press, 1996); Steven Stoll, *The Fruits of Natural Advantage: Making the Industrial Countryside in California* (Berkeley: University of California Press, 1998); Herman Vincent Moses, "The Orange-Grower is Not a Farmer: G. Harold Powell, Riverside Orchardists, and the Coming of Industrial Agriculture, 1893-1930," *California History* 74 (Spring 1995), 22-37; Richard Steven Street, "Tattered Shirts and Ragged Pants: Accommodation, Protest, and the Coarse Culture of California Wheat Harvesters and Threshers, 1866-1900," *Pacific Historical Review* 67 (November 1998), 573-608. For those who have focused on how corporate agriculture has shaped, but not necessarily determined, the experiences of workers, see Linda C. Majka and Theo J. Majka, *Farm Workers, Agribusiness, and the State* (Philadelphia: Temple University Press, 1982); Cletus Daniel, *Bitter Harvest: A History of California Farmworkers, 1870-1941* (Berkeley: University of California Press, 1981); Camille Guerin-Gonzales, *Mexican Workers and American Dreams: Immigration, Repatriation, and California Farm Labor, 1900-1939* (New Brunswick, NJ: Rutgers University Press, 1994); Devra Weber, *Dark Sweat, White Gold: California Farm Workers, Cotton, and the New Deal* (Berkeley: University of California Press, 1996). For the valley's environmental history, the most influential work remains Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (New York: Pantheon, 1985). Also important are William L. Preston, *Vanishing Landscapes: Land and Life in the Tulare Lake Basin* (Berkeley: University of California Press, 1981); Donald J. Pisani, *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1850-1931* (Berkeley: University of California Press, 1984). Recently David Vaught has sought to challenge the reliance on the corporate agriculture narrative. See, David Vaught, *Cultivating California: Growers, Specialty Crops, and Labor, 1875-1920* (Baltimore: Johns Hopkins University Press, 1999). Likewise Ian Tyrell has investigated cultural attitudes towards the environment in the valley and California more generally. See Ian Tyrell, *True Gardens of the Gods: Californian-Australian Environmental Reform, 1860-1930* (Berkeley: University of California Press, 1999).

water projects and environmental transformations of the twentieth century have not been foisted upon an unwitting or particularly resistant public by corporations or bureaucratic elites.<sup>2</sup> Certainly the powerful have benefited the most from these changes, but, in fact, for much of the twentieth century, most Americans wholeheartedly embraced massive technology in the Central Valley as elsewhere; and our love affair with technology, at least in its newer forms, seems hardly to have waned.

It is ironic that modern environmentalists look to the valley as a symbol of American failure, because for much of the last century and a half this region has been treated not as a landscape to be sacrificed to profits, but as a focal point for the enactment and realization of powerful cultural visions. Perhaps no other landscape has been so discussed, studied, and planned over the last century. Thus, an adequate explanation of what happened in the Central Valley has to embrace not only the economic desires of elites and the institutional imperatives of bureaucracies, but also the cultural and social desires of those who actively engaged in and supported the work of environmental transformation. Oftentimes, the ways in which individuals transform a landscape ultimately serves to bolster their own world view and collective identity. These historical projects -- one material, one cultural -- are intimately related, and not only in the nineteenth century during the period of conquest and colonization, but also in the

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<sup>2</sup> Norris Hundley, Jr., *The Great Thirst: Californians and Water, 1770s-1990s* (Berkeley: University of California Press, 1992); James Sherow, *Watering the Valley: Development Along the High Plains Arkansas River, 1870-1950* (Lawrence: University Press of Kansas, 1991); John Opie, *Ogallala: Water for a Dry Land* (Lincoln: University of Nebraska Press, 1993); Donald J. Pisani, "The Irrigation District and the Federal Relationship: Neglected Aspects of Water History in the Twentieth Century," in *The Twentieth-Century West: Historical Interpretations*, ed. Gerald D. Nash and Richard W. Etulain (Albuquerque: University of New Mexico Press, 1989), 77-101.

twentieth century as notions of American identity were reformulated in a period of rapid technological change and globalization. For those Americans who could identify themselves as part of a white middle class, it was not difficult to see their own personal lives implicated within the national projects of manifest destiny and technological progress that were propelling changes on the western landscape. This, then, is a cultural history of environmental change in the Central Valley.

The idea that Anglo-Americans perceived their identity as tied to the landscape is hardly new; it is the basis of so much that goes by the name of American exceptionalism. Environmental historians in particular have pointed to the ways in which the monumental scenery preserved in the earliest national parks was tied to the project of nineteenth-century nationalism. In the years following the Civil War, Americans invoked Yosemite Valley, the Grand Canyon, and the geysers of Yellowstone as evidence that God had marked out the North American continent and the American nation for a unique role in the world.<sup>3</sup> But it is has been not only sublime, scenic landscapes that have fostered projects of American identity, but also more prosaic landscapes in which ordinary people have found themselves traveling, living, and working. Particularly in the nineteenth century, American nationalism was very much a regional project which took place on the ground, in specific places and that grew out of the human interaction with particular environments -- forests, swamplands, rivers, prairies. By mixing their labor with the

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<sup>3</sup> Roderick Nash, *Wilderness and the American Mind*, 3rd ed. (New Haven: Yale University Press, 1982); Stephen J. Pyne, *How the Canyon Became Grand: A Short History* (New York: Viking, 1999).

nature they encountered in the Far West, Americans sought to transform both the landscape and themselves.

In the nineteenth century, as Anglo-Americans sought to colonize the Central Valley and displace its former occupants, they looked to the natural environment to both foreshadow and to legitimate their own success. In that world, most believed that the environment could directly shape human beings in both physical and moral ways. Thus the colonization of a new environment, like that of the Central Valley, created anxiety about the fitness of immigrant bodies and the stability of identity. Most obviously, both scientists and lay people believed that certain races prospered in particular environments while others did not, and thus the adaptability of Anglo-Americans to the Central Valley and the successful transplantation of their cultural forms and social hierarchies could not be assumed. To ease their own anxieties about emigration and settlement, nineteenth-century Americans looked to nature. They argued repeatedly that their particular ways of colonizing and transforming the land were a furthering, a finishing, of nature's own plans and processes and thus bound to succeed. As they moved into the Central Valley, a landscape in which aridity constrained agriculture and miasma threatened health, they looked for any indication that a synergy existed among white bodies, Anglo-American culture, and the Central Valley environment.

Over the course of the early twentieth century, however, many Americans came to understand the relationship between human beings and the landscape in increasingly technological terms. Others have also identified the early decades of the twentieth century as a critical turning point -- arguing that it was in this period that the nineteenth-

century vision of an agrarian culture was finally abandoned in the face of a corporate agriculture and the bureaucratic administration of the environment.<sup>4</sup> But the narrative of agrarian decline is only one way of telling the story. This shift was also characterized somewhat more positively by the rise of a modernist vision of the valley, embodied most clearly by engineers, that imagined the landscape as a hybrid of nature and technology.<sup>5</sup> Like their agrarian predecessors, engineers saw their work as a requisite finishing of nature, although in technological vein. At the same time, engineers and their supporters recast American identity as a product of technology as much as, or more so, than nature. Consequently, Americans bore a much greater responsibility for molding the landscape into materially sophisticated and culturally appropriate forms. Engineers took this responsibility upon themselves and set about to remake the valley accordingly.

In taking up these issues, this history recounts several episodes in the history of the Central Valley since 1849, showing in each case how moments in the history of a particular environment intersect with moments in the history of both the human body and American identity. It assumes that place, identity, and body are integral to one another. Above all, in telling again a history of the Central Valley, I try not to re-inscribe the notion that human beings exist apart from their environment, and that individuals -- at

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<sup>4</sup> Worster, *Rivers of Empire*; Pisani, *From the Family Farm to Agribusiness*; Tyrell, *True Gardens of the Gods*.

<sup>5</sup> On modernist visions of the landscape, see James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998); Denis Cosgrove, "The Measures of America," in *Taking Measures Across the American Landscape*, ed. James Corner and Alex S. MacLean (New Haven: Yale University Press, 1996), 3-13. On the relationship between modernity and nature-culture hybrids see Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993).

least Europeans and European-Americans -- have consistently seen the environment as a material and ontological other that must be overcome and *against which* they construct their own identities.<sup>6</sup> Instead I focus on the ways in which human beings perpetually engage with the non-human world and how ideas of human beings and ideas of environment are always connected -- their relational, but not necessarily oppositional, character.

Furthermore, this work responds to scholarship, particularly in cultural geography, that has generated an important critique of the ways in which both scholars and lay people take concepts of "space" for granted.<sup>7</sup> Typically we imagine space as a kind of first principle, as something pre-existent. Cultural geographers, however, urge us to recognize that ideas of space and of particular places, regions, and geographies always emerge through historical processes and depend upon cultural and social contexts. Space can never precede our own understanding of it nor the language that we use to describe it. This becomes most obvious when different ideas of space intersect -- for instance, in the radically different but equally useful mapping practices of Native Americans and Anglo-Americans.<sup>8</sup> Such encounters underscore the point that abstract representations of space,

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<sup>6</sup> Marjorie Levinson, "Pre- and Post-Dialectical Materialisms: Modeling Praxis Without Subjects and Objects," *Cultural Critique* 31 (Fall 1995), 111-27.

<sup>7</sup> Henri Lefebvre, *The Production of Space*, trans. Donald Nicholson-Smith (London: Blackwell, 1991); Edward Soja, *Postmodern Geographies: The Reassertion of Space in Critical Social Theory* (London: Verso, 1989); Neil Smith, *Uneven Development: Nature, Capital and the Production of Space* (Oxford: Basil Blackwell, 1990).

<sup>8</sup> Louis De Vorse, "Silent Witnesses: Native American Maps," *Georgia Review* 46 (Winter 1992), 709-26; Barbara Belyea, "Inland Journeys, Native Maps," in *Cartographic Encounters: Perspectives in Native American Mapmaking and Use*, ed. G. Malcolm Lewis (Chicago: University of Chicago Press, 1998), 135-56. For similar observations in a different historical context, see Thongchai Winachakul, *Siam Mapped: A History of the Geo-Body of a Nation* (Honolulu: University of Hawaii, 1994).

such as those of longitude and latitude, and even the idea of space as a universal void, are historical productions that emerge out of particular social contexts.

For historians, if we take notice of space, it is often only to briefly describe the setting and then move on to our proper historical story.<sup>9</sup> The tendency is to treat space as a stage upon which historical action takes place rather than to examine the ways in which ideas of space are themselves historical and implicated within our narratives. Even environmental historians, who describe with considerable sophistication the myriad ways in which human beings have reworked the material places that they inhabit, have seldom paid careful attention to the ways in which culture and language shape particular places in tandem with human labor and technology. In contrast, this history remains attentive to the emergence of the Central Valley as a space in Anglo-American minds and to the ways in which that space is both materially reworked and culturally redefined over time.

At the same time, this history focuses on the place of the human body in environmental discourse. It is ironic that for all their careful focus on the material world and the changes worked upon it, environmental historians have rarely focused on the human body as the locus of environmental understanding. Quite the opposite has been the case. Environmental historians have repeatedly referred to the cultural processes of abstraction and commodification as *the* dominant modes of environmental understanding and also as the principal explanation of environmental change, as if bodies really didn't

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<sup>9</sup> For attempts to resist this tendency, see Paul Carter, *The Road to Botany Bay* (London: Faber, 1987); Mitchell, *The Lie of the Land*.

matter.<sup>10</sup> Ultimately, relationships between human beings and the environment are always mediated by understandings of the material human body. Often times the body is seen as "part of" nature, a Darwinian view that places human beings within a larger natural whole. Perhaps more commonly, however, the body is simply unacknowledged and thus collapsed into a Cartesian subject that stands apart from and outside of nature.<sup>11</sup> Our tendency to rely on dichotomies -- humans versus nature, humans versus machines -- results in an erasure of the body or at least an oversimplification of the human subject. Phenomenologically inclined scholars, on the other hand, point to the ultimate and continuing significance of the material human body to knowledge and, perhaps particularly, to the body's critical role in the construction of place.<sup>12</sup> Such thinking insists that even our most abstract understandings of the world originate with our understanding of our own bodies and our efforts to move through and labor in an environment. The body is always there in daily life, providing our experience of the world, and reinforcing

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<sup>10</sup> On the environmental historians' neglect of the body, see Christopher Sellers, "Thoreau's Body: Towards an Embodied Environmental History," *Environmental History* 4 (October 1999), 486-515. For examples of the ways in which the body might be incorporated into environmental histories, see Christopher Sellers, *Hazards of the Job: From Industrial Disease to Environmental Health Science* (Chapel Hill: University of North Carolina Press, 1997); Conevery Bolton, "'The Health of the Country': Body and Environment in the Making of the American West, 1800-1860" (Ph.D. diss., Harvard University, 1998); Arthur McEvoy, "Working Environments: An Ecological Approach to Occupational Health and Safety," *Technology and Culture* 36 (Suppl., 1995), 145-73.

<sup>11</sup> Leo Marx, "The Domination of Nature and the Redefinition of Progress," in *Progress: Fact or Illusion?*, ed. Leo Marx and Bruce Mazlich (Ann Arbor: University of Michigan Press, 1996), 145-73.

<sup>12</sup> Maurice Merleau-Ponty, *Phenomenology of Perception*, trans. Colin Smith (London: Routledge & Kegan Paul, 1962); William Casey, *The Fate of Place: A Philosophical Inquiry* (Berkeley: University of California Press, 1997); David Abrams, *The Spell of the Sensuous: Perception and Language in a More-Than-Human World* (New York: Vintage Books, 1997); Carter, *The Road to Botany Bay*. For the importance of bodily understandings, specifically those arrived at through labor, to environmental historians, see Richard White, "Are You an Environmentalist or Do You Work for a Living?" in *Uncommon Ground: Toward Reinventing Nature*, ed. William Cronon (New York: Norton, 1995), 171-85.

and sometimes contradicting the abstract knowledge that we carry in our heads. As the philosopher Henri Lefebvre has written, "At times the body...gets covered up, concealed from view, but then it re-emerges -- then it is as it were resuscitated."<sup>13</sup>

Underlying this history then is an effort resuscitate the body as part of the environmental (and spatial) history of the Central Valley. If we consider human agency to be not only mental but corporeal, it becomes clear that places cannot be understood apart from bodies, nor bodies from places.<sup>14</sup> The physical, embodied experiences of individuals have been critical to the construction of the Central Valley as a discrete place. And many of the environmental transformations that took place in the valley were related to concerns about the vulnerability of human bodies. Yet by insisting on the importance of the body, I do not want simply to reinstate here either a Darwinian naturalism nor a romanticist transcendentalism; instead I want to consider the body as a kind of third term -- as something that is critical to that which we call "identity" and also the locus of our material engagement with non-human world.

As I have suggested, this work is partly a response to the paradigm of domination -- the purported desire on the part of human beings to dominate and control nature -- that still lies at the heart of many environmental and environmentalist histories. Although it is beginning to give way, the paradigm of domination has gained wide acceptance and has proved remarkably enduring in both scholarly and popular accounts of environmental

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<sup>13</sup> Lefebvre, *The Production of Space*, 196.

<sup>14</sup> Elizabeth Grosz, "Space, Time, and Bodies," in *Space, Time, and Perversion: Essays on the Politics of Bodies* (New York: Routledge, 1995), 83-101.

change. In this view, it has been the Euro-American tendency to see the environment as amenable to scientific abstraction and to capitalist commodification that has pushed forward the environmental transformations of the modern era.<sup>15</sup> Yet in the effort to locate the roots of modern environmental problems, scholars have often overemphasized the evidence that indicates attitudes of domination and control and that suggests that individuals have historically perceived themselves as separate from nature. At the same time, scholars have overlooked much evidence that indicates the perceived connections between human beings and the non-human world.<sup>16</sup> In a contemporary world in which both technology and global capitalism obscure our dependence upon and involvement with the non-human world -- the source of the electricity that we consume, the coffee that we drink, the cotton in our clothing -- it is only logical that we still find compelling those intellectual theories that emphasize detachment, alienation, and domination. For modern Americans -- and more generally, for those in the industrialized world -- nature seems increasingly remote. It is something "out there," that we go to, study in environmental science classes, take pictures of, or read about, something that we are not part of. Thus

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<sup>15</sup> This has underlain innumerable environmental histories. For some of the best histories of the effects of capitalism and commodification, see William Cronon, *Nature's Metropolis: Chicago and the Opening of the West* (New York: Norton, 1991); Donald Worster, *Dust Bowl: The Southern Plains in the 1930s* (Oxford: Oxford University Press, 1979); Carolyn Merchant, *Ecological Revolutions: Nature, Gender, and Science in New England* (Chapel Hill: University of North Carolina Press, 1989). For the effect of scientific abstraction on attitudes toward nature, see Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (San Francisco: Harper and Row, 1980); Neil Evernden, *The Social Creation of Nature* (Baltimore: Johns Hopkins University Press, 1992).

<sup>16</sup> In an analogous vein, a few scholars have recently challenged the adequacy of the metaphor of environmental conquest for understanding rural America in different times and places. See Mark Fiege, *Irrigated Eden: The Making of An Irrigated Landscape in Idaho* (Seattle: University of Washington Press, 1999); Richard Judd, *Common Lands, Common People: The Origins of Conservation in Northern New England* (Cambridge, MA: Harvard University Press, 1997); Tyrell, *True Gardens of the Gods*.

even while acknowledging the power of the domination paradigm to explain our contemporary situation, this history seeks to complicate our understanding by uncovering those places and moments when human beings have perceived their own, often bodily, connection to nature and to technology. In the process, I want also to suggest that the heightened alienation that we now sense all too well is a relatively recent phenomenon that should not be read too easily back onto the nineteenth or even the early twentieth century. As a corollary, this suggests that we might look for the antecedents of something like a modern environmental consciousness not merely in persons like John Muir or in phenomena such as wildlife conservation, but in unlikely people and places -- nineteenth-century farmers, twentieth-century engineers, California's Central Valley. Those people most engaged in, and those places most affected by, dreams of environmental transformation.

The chapters that follow challenge the intellectual separation of human beings and the environment by focusing on the perceived relationship between human bodies and projects of environmental transformation over the course of little more than a century. In the first three chapters, I describe nineteenth-century concerns over travel, agricultural labor, and the problem of miasma and disease -- focusing in each case on the prominent role of the body in understandings of the environment and the corresponding role of the environment in shaping collective identity. Then, turning to the twentieth century, I describe the two major engineering projects undertaken in the valley -- the construction of the Central Valley Project, a stupendous effort to reorganize and regulate the valley's hydrology in the interest of irrigation, and the construction of a modern freeway system

between roughly 1945 and 1970. In these chapters, I evaluate modern engineering and public works as a repository of cultural values and a site of cultural production, paying particular attention to how the technological reworking of the landscape is, often surprisingly, bound up with concerns over the place of vulnerable human bodies in the modern world. In each case, I am interested in how projects of environmental transformation reflect existing understandings of a particular environment, human identity, and technology, and at the same time compel individuals to rethink and reformulate the relationship between and among these entities.

In turning to the Central Valley to ask these questions, I necessarily write alongside a considerable scholarly literature, analyzing some new sources along with many sources that others have also studied. I come to all of these documents, however, with different questions and use them for different purposes. The sources, of course, are open to multiple questions and readings. However, I read "against the grain" -- by which I mean the practice of reading documents not for their intended meanings, but with an eye for the self-promotional and self-concealing intentions of their authors -- much less than most historians of the Central Valley.

One of the critical problems of historical practice that interests me here is how to interpret the persistent gap between ways of talking and action in the world. Reading against the grain is a well established and venerable method for confronting this problem, and one that has gained considerable sophistication after two decades in which post-structuralism and linguistic theory have been among the dominant modes of understanding within academia. For many contemporary historians, reading the

documents of the powerful with an eye toward irony as well as for their omissions, paradoxes, and contradictions offers the possibility, or at least the hope, of telling a history from below.<sup>17</sup> Yet there is a danger here that, in the process of recovering a history from below, we may reduce the powerful to caricatures of themselves and thus fail to understand adequately the sources and the gaps of their power. Even if actions often belie rhetoric, I am often reluctant to take that as evidence that the rhetoric had no meaning to those who engaged it. In other words, there are moments when I take the powerful and literate at their word in order to better understand the culture that they inhabit. In part, this is because I come to the project of one particularly powerful group -- engineers -- with both skepticism and sympathy. Skepticism because I am well aware of the environmental and often social costs of modern American engineering, particularly civil engineering -- that branch of engineering that has been most responsible for the transformation of the natural world. Sympathy because I began my own career as an engineer and am well aware of the social, even utopian, impulses that can lie behind the desire to transform the environment, even in sometimes radical ways -- which is not to say that social and utopian desires cannot be deeply problematic.<sup>18</sup> While I have no desire to defend the results of modern engineering in the Central Valley, I am interested in more fully understanding the cultural visions that lay behind such Herculean efforts, as

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<sup>17</sup> The literature here is vast. Some classic and influential works include James C. Scott, *Domination and the Arts of Resistance: Hidden Transcripts* (New Haven: Yale University Press, 1989); Gayatri Chakravorty Spivak, "Subaltern Studies: Deconstructing Historiography," *Subaltern Studies* 4 (1985), 330-63; Gayatri Chakravorty Spivak, "Can the Subaltern Speak?," in *Marxism and the Interpretation of Cultures*, ed. Cary Nelson and Lawrence Grossberg (Basingstroke: Macmillan Education, 1988), 271-313.

<sup>18</sup> On the utopianism of modernist planning schemes, see Scott, *Seeing Like a State*.

well as their connections to and departures from earlier visions of environmental transformation.

**Part I: Bodies and Landscape in the Nineteenth Century**

## Chapter One

### Travel

Phenomenological philosophers remind us that space comes into being through movement and that movement is always known through the physical body. As Maurice Merleau-Ponty wrote, bodily "motion is productive of space." Or, in the words of William Casey, the body's movement, rather than "effecting a mere change of position, *constitutes place*, brings it into being."<sup>1</sup> These philosophers insist that human subjectivity is inseparable from both the human body and the world that it inhabits; consequently, they caution us against thinking of space as pre-existent, as something separate from the human beings who occupy or travel through it. Even our most abstract concepts of space emerge through the body, for it is our bodies that provide us with the fundamental experiences of directionality and orientation. And it is through the body's movement that we come to understand both the dimensionality and the texture of the world around us.

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<sup>1</sup> Maurice Merleau-Ponty, *Phenomenology of Perception*, trans. Colin Smith (London: Routledge & Kegan Paul, 1962), 387; Edward S. Casey, *The Fate of Place: A Philosophical History* (Berkeley: University of California Press, 1997), 235.

Even while bodily movement does not literally create mountains or rivers, it is the experience of traveling through these regions that gives meaning to both the terms and their topographic representation. Abstract knowledge of places -- that is, the knowledge produced by maps, measurements, and geometry -- always has its roots, however distant, in the material human body. It would be impossible to understand a topographic map if no one had ever experienced a changing topography. We understand what a mountain is because we know the physical difference between climbing up and moving across a flat plain. Moreover, before the rise of aerial and satellite photography in the mid-twentieth century, it was impossible to know anything of a place without someone physically traveling through it. Untraveled spaces existed only as imaginings. Even if knowledge were transmitted by mouth or by map to those far away, geographic understanding always originated with an individual who had *been* there. In this sense, the experience of travel produces geography, in the most literal sense.

For historians, a consideration of travel offers the opportunity to consider the ways in which modes of travel have mediated relationships to the environment for different people in particular times and places. As industrialized forms of travel displaced travel that was dependent upon the muscle power of humans and animals, they changed the nature of people's interactions with particular places and thus changed their perception of, and reaction to, those places.

Attention to travel allows the consideration not only of how individuals construct and respond to particular landscapes, however, but also an examination of how

individuals construct their own identities in relationship to new environments. Travel and movement constitute not only space, but also contribute to the experience and social identity of those who travel. It is through movement that we gain a greater awareness of our own particular body -- how it tires, which muscles are stronger and which are weaker, how our skin reacts to different sensations. And it is through the process of traveling that many of the common categories of social difference may be both challenged and brought more sharply into focus. Traveling, by simultaneously foregrounding physical experience and taking the body out of its familiar social environment, potentially raises anew questions of personal identification. Questions of race, gender, and class often intersect with and depend upon understandings of place, as understandings of particular places are too often grounded in ideas of social difference. And because identity is often linked so tightly with particular places, travel can create anxieties over the instability or even loss of identity.<sup>2</sup> Movement and travel ultimately shape perceptions of both landscape and human beings. Accordingly, both the construction of space and the construction of identity were at stake when Anglo-Americans began to arrive in California's Central Valley in the mid nineteenth century.

What distinguished the Central Valley in this period was not simply a relatively unknown and unusual geography but the heterogeneity of the population moving through it. Mid-nineteenth century travelers and immigrants experienced an environment that

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<sup>2</sup> Inderpal Grewal, *Home and Harem: Nation, Gender, Empire, and the Cultures of Travel* (Durham, NC: Duke University Press, 1996), 94.

was fluid both naturally and socially. And consequently they struggled to understand the landscape and, at the same time, to maintain a familiar sense of self. Early discussions of travel are as much about bodies and people as they are about landscape and environments. They suggest again and again the ways in which environments and identities intersect, via the bodies of travelers, and how new environments, such as those found in California, might create anxieties over immigrant identities. For early travelers, the relationship between body and landscape was understood, at least implicitly, as reciprocal. Each implied the other. This chapter is an effort to explore and unpack the relationship among identity, body, and place as they emerged through processes of travel in mid-nineteenth century California.

In 1849 the Central Valley was, by all accounts, a space of traveling. Certainly movement and travel constituted the principal means by which the Central Valley was experienced and known by European-Americans and many other groups during the years of the California Gold Rush. The mines lay in the foothills on the eastern edge of the valley, and the valley's geographical proximity to the gold deposits was soon complemented by the links forged by both economic markets and migratory peoples.

By the mid-nineteenth century abstract notions of space were already culturally well-enshrined among European-Americans. Immigrants to California came with guidebooks; they relied on maps and compasses and thought in terms of measurable

distances and cardinal directions. Moreover, in the wake of the Mexican conquest, agents of the American government were embarking on ever more detailed topographic surveys of the region in order to establish roads, railroad routes, land titles, and river improvement projects. Analytical thought and rationalized representations were in the process of transforming the regional environment. Yet even as such abstract knowledge about places is, and was, produced, it is always complemented by the physical experiences of individuals. This is especially so in an unknown, unfamiliar and not fully colonized environment. The relative lack of detailed, reliable knowledge about a place, combined with the related absence of regularized routes of travel, forces individuals to rely more obviously on their own personal knowledge of the landscape. The ability to think abstractly is of little practical use when you lack maps and instruments. Knowledge of California in this period was still localized in precisely this way when gold was discovered and immigrants rushed in.

In the eighteen forties, California was isolated from the United States and difficult to penetrate, bounded as it was by the Sierra Nevadas on one side and by the Pacific Ocean on the other. Through the first five decades of the century, Indian hostility had limited both Mexican and Anglo settlement within the Central Valley, and, for the most part, those groups remained primarily on the coast.<sup>3</sup> With the discovery of gold, individuals rushed across continents and oceans to reach the gold fields, and the valley

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<sup>3</sup> George Harwood Phillips, *Indians and Intruders in Central California, 1769-1849* (Norman: University of Oklahoma Press, 1993).

was abruptly drawn into the geography of the mines. Because the valley stood between many would-be gold miners and their destination, it was the last space they had to pass through during the most arduous journey they would ever make. It was quite literally a space of travel and movement as the very term *Gold Rush* implies.

Because the immigrants came in such numbers and so quickly, there was no time for routes of travel to be methodically worked out and space to be systematically demarcated. The official geography of the state was still up for grabs, as massive immigration began right on the heels of the Mexican conquest. The accurate topographic depiction of the landscape, particularly in the valley, would frustrate Californians for at least a decade to come. The state Surveyor-General complained in 1854 that while in the rest of the country "the compass of the surveyor usually preceded the plough of the settler," the situation in California was "precisely the reverse."<sup>4</sup> Geography in California was an individual, or at least a very local, affair in the early 1850s.

Moreover, because of its ecological and hydrological complexity, the valley's landscape proved particularly difficult to represent abstractly, and this would be a paramount issue in California through the 1860s. "Ownership," an abstract concept, requires the translation of the landscape into an abstract form. Yet in the valley, this was easier said than done. The problem lay partly with the hydrological fact that much of the region was a vast seasonal marsh and the legal status of such a changeable and fluid

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<sup>4</sup> California Surveyor-General, *Annual Report 1854* (Sacramento, 1854), 42.

landscape was open to question.<sup>5</sup> Technically, all "swamp and overflowed lands" had been granted to the states by the Arkansas Act of 1850. Yet in California, the state and federal governments argued over the precise delineation of these lands for more than a decade. The problems of representing such lands on a map were multiple. Californians felt that the federal surveys had erred by not recognizing enough swamp (that is, state) land. The presumed errors were made more critical by the fact that in many cases the state had already sold much of the land to settlers or speculators on the assumption that it was the state's to sell. The federal survey threw those land claims into question and the resulting uncertainty hindered efforts at reclamation. In many counties, local officials bemoaned the slow pace of "improvement" on the part settlers who were afraid to make improvements that might undermine their claims to ownership.<sup>6</sup>

The state Surveyor-General complained that the federal agents did not adequately understand the valley's landscape and its seasonality. While the vast winter overflows made it impracticable to survey the region in the winter, surveying in the summer, when most of the land was dry, did not adequately reveal the extent of the overflowed lands. Moreover, existing levees and embankments had already altered the landscape. The state repeatedly insisted that the determination of swamp and overflowed lands must be made

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<sup>5</sup> For a more general analysis of this problem in the nineteenth and twentieth centuries, see Theodore Steinberg, *Slide Mountain, or, The Folly of Owning Nature* (Berkeley: University of California Press, 1995).

<sup>6</sup> Richard H. Peterson, "The Failure to Reclaim: California State Swamp Land Policy and the Sacramento Valley, 1850-1866," *The Historical Society of Southern California* 56 (Spring 1974), 45-60.

on the basis of the land before such human "improvements" had been made.<sup>7</sup> State surveyors and representatives repeatedly insisted that it was only local *experience* of the landscape that could yield adequate maps. For instance, in one particular dispute in the San Joaquin Valley, the state agent George H. Goddard proposed the true demarcation line could only be established by taking evidence from local, disinterested witnesses who could testify based on their "personal knowledge" of the area.<sup>8</sup> What Goddard and the Surveyor-General were arguing was the necessity of experiential rather than abstract knowledge. The best instruments and surveyors could not accurately depict the landscape if they lacked experience and local knowledge of the region.

Thus the relationship to the Central Valley forged by European-Americans in the mid-nineteenth century was, for at least a moment, still individual and local. The region had not been systematized, and consequently for travelers the valley was an unknown entity in which few roads had been laid out and mapped. The opacity of the landscape is a theme that emerges repeatedly in gold rush accounts. As one argonaut told those who would follow, "It would be impossible to describe the routes particularly, considering that

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<sup>7</sup> A particular conflict emerged over "natural" grasslands — those seasonally flooded lands that supported a crop of (unplanted) grass in the spring. Federal surveyors claimed that any land used to grow crops (in this case, forage grasses) was not swampland. Settlers and state officials, of course, disagreed. California Surveyor-General, *Annual Report 1858* (Sacramento, 1858), pp. 6-7, 19.

<sup>8</sup> California Surveyor-General, *Annual Report 1859* (Sacramento, 1859), p. 55.

they go mostly through an uninhabited country; the only sure way to learn the direction of the place one intends going to, is to enquire at the place he starts from."<sup>9</sup>

Roughly 40,000 people arrived in California by sea during the Gold Rush years, most of whom were prospective miners. They then faced the choice of either traveling by water up the Delta or rounding the south end of San Francisco Bay and crossing through the northern San Joaquin Valley. While seemingly a minor journey after the experience at sea (and, for some, the crossing of Panama), this last bit of traveling through the valley was nonetheless known to be trying. Roads were scarce and often incapable of supporting carts or wagons.<sup>10</sup> Those argonauts who entered the valley and left diaries of their journey repeatedly emphasized the physical and bodily nature of travel.

Preparing to leave San Francisco, the argonaut C.S. Lyman wrote in his journal that he was unsure whether to make the longer journey through Carquinas Straits and the Delta, or to traverse the San Joaquin valley where "we will have to ferry the river at flood on bullrushes, & cross interminable & bottomless mudholes...."<sup>11</sup> Lyman chose the latter, and as predicted he found the journey through the valley difficult. He complained in particular about the thick tulé swamps, which in places stretched for miles on either side of the river, and the innumerable mosquitoes, as well as of the difficulty of locating river

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<sup>9</sup> F.P. Wierzbicki, *California As It Is & As It may Be, Or a Guide to the Gold Region* (1849; reprint, New York: Burt Franklin, 1970), 53-54.

<sup>10</sup> Walter Colton, *Three Years in California* (New York: A.S. Barnes & Co., 1850), 264.

<sup>11</sup> C.S. Lyman, "The Gold Rush: Extracts from the Diary of C.S. Lyman, 1848-1849," ed. Frederick J. Teggart, *California Historical Society Quarterly* 2 (October 1923), 182.

crossings. At times, the plains were so flooded with water that travelers could not even approach the main rivers. Frequently, both men and animals drowned in the attempt to cross.<sup>12</sup> When they did reach the river, they were forced to cross not just the main channel but several sloughs, each of which presented problems for the pack animals. As Lyman described it:

Passed 2 or 3 sloughs, water 4 ft deep, several teams mired down, after much trouble reached the river at night having spent the day making 1½ miles.<sup>13</sup>

Travel through the Delta, however, was equally slow, frustrating, and laborious. Before 1850 and the arrival of several steamboats, the voyage from Sacramento to San Francisco lasted between six and eight days. The speed of travel depended upon nature itself -- the direction and speed of the winds and tides. What is remarkably consistent in the forty-niner accounts of travel is their reference to the *time* that it takes. In a hurry to reach the mines and stake their claims before the gold ran out, they counted each day spent traveling as a loss. Moreover, there was no way to predict accurately the ultimate length of the voyage. For the initial part of the journey, ships could rely upon winds, but once in the midst of the Delta vessels had to rely on tides or labor power. Most frequently, passengers were called upon to assist in "warping" their vessel, which

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<sup>12</sup> Colton, *Three Years in California*, 269-70.

<sup>13</sup> Lyman, "The Gold Rush," 183.

involved tying a rope to a tree or stump and then having passengers on board pull their ship upstream. To pull a large boat upstream by hand was incredibly exhausting work.

As the Irishman Thomas Kerr described it:

We feel too again to Cast the rope out of the Boat again and drag on it by to Tri and get ourselves Toed out of this Blasted Slough....It is severe work My hands are Blistered pulling, the trees on each side the river are so high & close that there is scarcely a Breath of wind to carry us against the flood....<sup>14</sup>

Kerr experienced the environment of the valley with his body -- as blisters, heat, and aching muscles. He measured the valley's environment by both the amount of energy he had to expend and the amount of time it took to traverse it, and by the physical marks that work left on him.<sup>15</sup> His body served as an index and a map of sorts. By noting the blisters and exhaustion he recorded what the environment of the valley was like from his own experiential perspective.

The physical toll of traveling in the valley was further exacerbated by the problem of disease. Travelers in this period frequently fell ill. They suffered from scurvy and

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<sup>14</sup> Thomas Kerr, "An Irishman in the Gold Rush: The Journal of Thomas Kerr," ed. Charles L. Camp, *California Historical Society Quarterly* 8 (March 1929), 18.

<sup>15</sup> Richard White has emphasized the importance of human labor to understandings of the environment. See his article, "Are You an Environmentalist or Do You Work for a Living?" in William Cronon, ed., *Uncommon Ground: Toward Reinventing Nature* (New York: Norton, 1995), 171-85, as well as his book, *The Organic Machine: The Making and Unmaking of the Columbia River* (New York: Hill and Wang, 1995).

malnutrition and were also subject to diseases that periodically raged through the region, notably malaria and cholera. As will become clear in Chapter Three, nineteenth-century Americans perceived disease as a product of the environment itself, while at the same time, diseased bodies found the process of traveling through that environment even more difficult.<sup>16</sup> Those who were sick were apt to perceive the valley as doubly hostile.

The Gold Rush brought not only would-be miners to the valley, however, but also Lieutenant George Derby of the U.S. Army Corps of Topographical Engineers. While not a gold-seeker himself, Derby had been sent by the federal government in 1849 as part of an effort to regulate Indian-white conflicts that had intensified as Americans poured into California. His instructions were to survey the area, to note the presence of useful resources, to ascertain the numbers and disposition of local Indians, and to locate an Army post. His intention was to map the valley and to locate routes of travel that could be marked out and improved upon.<sup>17</sup>

Derby entered the valley with abstract conceptions of space in mind. He brought with him modern topographical instruments: surveyor's chains, compasses, and a chronometer. His goal was to impose a rational order on the land and to enable its

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<sup>16</sup> Carl I. Wheat, ed., *The Shirley Letters from the California Mines, 1851-1852* (New York: Alfred A. Knopf, 1949), 4; Wierzbicki, *California As It Is and As It May Be*, 59, 99.

<sup>17</sup> George H. Derby, "The Topographical Reports of George H. Derby," ed. Francis P. Farquhar, *California Historical Society Quarterly* 11 (June 1932), 99-123; George H. Derby, "The Topographical Reports of George H. Derby (II)," ed. Francis P. Farquhar, *California Historical Society Quarterly* 11 (September 1932), 247-65. Derby was the first American to survey the entire region, although earlier surveys of limited areas had been by expeditions led by Charles Wilkes and John Fremont. See William H. Goetzmann, *Exploration and Empire: The Explorer and the Scientist in the Winning of the American West*

administration by a distant authority. He represented the government's modernizing impulses. Derby's job was to make the valley legible to those far away, to make knowledge of the region less personal and more portable. But to his dismay, Derby found that the landscape itself often subverted his desire to rely on instruments and abstract measurements, throwing him back on his own personal resources of observation and description. His instruments, particularly the chronometer, were too sensitive to withstand the difficult journeys. Despite his assiduous attention to measurement, he doubted his longitude recordings because "the unhappy instrument had been so jolted over rough roads and had altered its rates in such a very unexpected and inconsistent manner...that we could place but little reliance upon its accuracy."<sup>18</sup> In this instance, the landscape itself rendered his instruments useless and his mapping project impossible.

Although Derby did periodically note the presence of trees, the availability of water, and his own assessments of soil fertility, his written report is still less a catalog of resources than a diary that delineates the difficulties of physical movement. Derby traveled through the Sacramento Valley in the fall, a season in which the landscape is extremely dry and daily temperatures quite high. Not surprisingly, he found it oppressive; he complained frequently of the heat and his party's thirst.<sup>19</sup> The condition of

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(New York: Alfred A. Knopf, 1966) and Richard Eigenheer, "Early Perceptions of Agricultural Resources in the Central Valley of California" ( Ph.D. diss., University of California at Davis, 1976), 127-39.

<sup>18</sup> Derby, "The Topographical Reports," 112.

<sup>19</sup> Derby, "The Topographical Reports," 114. Also William Brewer, the head of a survey party, made similar complaints throughout his journey through the San Joaquin Valley. For instance, "The bad water, dust alkali, and change of diet begin to tell on the boys...." William H. Brewer, *Up and Down California in*

the soil made traveling more difficult. Much of the valley, particularly along trails or waterways, would have been rutted by the spring runoff. Derby described their efforts to cross the "dry and parched prairie" that was "cracked in some places to the breadth of six or eight inches, rendering the wheeling extremely laborious...."<sup>20</sup>

After spending the winter in San Francisco, Derby traversed the more southern San Joaquin and Tulare valleys the following spring, typically a more pleasant season in the interior. Yet he still found the environment somewhat intractable. While the dry ruts of autumn had disappeared, he encountered a landscape reworked by gophers and ground squirrels. He called it the "most miserable country" he had ever seen. As he put it, the holes and burrows, "into which a horse sinks to his knees at almost every step, render the travelling difficult and dangerous."<sup>21</sup>

Yet for all the difficulties of travel during the late spring and summer, they were unquestionably superior to the winter and early spring when the entire valley became a "thick, tenacious quagmire."<sup>22</sup> Travel in this period was still highly circumscribed by the

*1860-1864: The Journal of William H. Brewer, Professor of Agriculture in the Sheffield Scientific School from 1864 to 1903* (New Haven: Yale University Press, 1930), 510.

<sup>20</sup> Derby, "The Topographical Reports," 116.

<sup>21</sup> Derby, "The Topographical Reports," part 2, p. 255. The difficulty of traversing the gopher holes and squirrel dens was a common theme in many early travel accounts. For instance, William Blake, a geologist who accompanied the Pacific Railroad surveys in the early 1850s, wrote of the region, "It was also completely undermined in all directions by thousands of burrowing animals (rabbits and squirrels), so that the feet of my mule were continually breaking through, rendering it extremely difficult to proceed, and dangerous to travel faster than a walk. The animals often sank suddenly up to their shoulders in these places." Congress, Senate, *Reports of Explorations and Surveys to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean*, 33<sup>rd</sup> Cong., 2<sup>nd</sup> sess., 1856, H. Ex. Doc. 78, 5:77.

<sup>22</sup> Derby, "The Topographical Reports," 108.

seasons; moving through the valley brought travelers into contact with the natural variability of the environment. They wrote of the heat in summer, the incessant mosquitoes in autumn, and most of all, of the massive flooding of early spring. The valley's watercourses are now well-known for their propensity to flood, despite more than a century of concerted efforts at water control. Fed by a combination of snowmelt and heavy seasonal rainfall, streams and rivers in the region rise rapidly and typically overflow their banks in regular places, creating a network of seasonal sloughs and inland lakes. Much of the valley, particularly near the main river channels, became a large marshland in early spring. In the wettest years, large sections of the more northern Sacramento valley would be completely covered by water for days, creating what appeared to be an "immense sea."<sup>23</sup> Early travelers and immigrants to the region found this regional hydrology perplexing, frustrating, and frequently terrifying. Derby noted the variability of the rivers and was frustrated in his own attempts to cross on more than one occasion. At one point, his party found itself desperately caught in rising water, forcing them to abandon their wagon in the flood. Recognizing the danger of their situation, Derby

gave the order to the teamster to turn about immediately, but it was too late  
-- the mules sank at once on turning from the road, the wagon was fast

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<sup>23</sup> Edward Belcher, *Narrative of a Voyage Around the World*, (London: Henry Colburn, 1843), 2:123.

blocked in the yielding mud, and the water as we afterwards found, was gaining on us at the rate of four feet an hour.<sup>24</sup>

Derby's narrative suggests again and again that more than his instrumental measurements, his physical experience was critical to his understanding of the landscape: the pull of the mud, the strength of the river, the depth of the gopher hills. Travel, in his account, is always fundamentally a matter of energy expenditure, either human or animal. The maps that accompany his narrative, in contrast, provide a comparatively poor record of the landscape through which he traveled. Convention confines the map to certain types of expression. Representations are necessarily simplified; certain details are omitted. Derby drew the rivers as discrete lines, as convention dictated, with no indication of the side channels and sloughs that often forced travelers to cross a single river several times. As anyone who had traveled through the valley in this era knew, the rivers were anything but stationary and clearly delineated. Similarly, gopher-pocked prairies, while painfully significant to the horseback traveler and to Derby himself, do not appear on his map. Moreover, the maps provided only a spatial representation of what was a spatio-temporal journey. By themselves the maps gave little indication of how long the journey might take, especially since routes of travel in this period were not uniform or even stable. Ferry locations, for instance, could change rapidly in response to changes in the river, the loss of equipment, or the death or departure of a ferryman.

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<sup>24</sup> Derby, "The Topographical Reports," 118-19.

Roads in the lowlands were wiped away annually and had to be re-established each spring. And even though the difficulty presented by a watery and overflowed landscape is the most salient aspect of Derby's narrative, there is little evidence of this frustrating seasonality on his maps. Derby did label one particular road as "impassable during the rainy season," and he also recorded that a certain area of "plains" were "overflowed in winter," but that is the extent to which seasonal variation -- the most critical factor for anyone traveling through the valley -- was represented on his map.

Such maps helped to encourage unrealistic expectations for the landscape, for when Americans saw rivers, they immediately presumed them to be transportation corridors.<sup>25</sup> Early assessments of navigability in the Central Valley were decidedly over-optimistic. River transport was seen as so critical to California's development that one of the first acts of the state legislature was to declare several sections of rivers as officially "navigable" and subsequently to make it illegal to obstruct those streams or to make any improvements upon them without the consent of the relevant county authorities. It was an exercise in wishful thinking. They declared the Feather River navigable to a point ten miles above Oroville, despite the fact that regular travel did not go beyond the mouth of the Yuba, more than 25 miles to the south. On the mainstem of the Sacramento River, Red Bluff served as the head of navigation during the high-water season, but here the

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<sup>25</sup> An early and striking example of this can be found in Thomas Jefferson, *Notes on the State of Virginia* (1787; reprint, New York: Penguin, 1999), 7-18.

legislature declared that navigability extended forty miles further north.<sup>26</sup> As for the San Joaquin River, the Legislature designated it navigable all the way south to Tulare Lake. This was particularly optimistic, since the San Joaquin River and Tulare Lake actually existed in separate watersheds, which connected only in periods of *extreme* high water. Even during the record flood of 1861-62, a small steamboat that attempted to pass from the San Joaquin River to Tulare Lake through some flooded sloughs became stranded in the tulelands and had to be abandoned.<sup>27</sup> In actuality, the head of navigation on the San Joaquin during high water was Sycamore Point, just north of Fresno City -- although local boosters consistently maintained in the 1850s that with some snag removal and channel improvements navigability could be extended along all the area's rivers.

Moreover, Anglo-Americans did not confine their visions of water travel only to the existing natural rivers; they envisioned waterways winding through the very driest sections of the valley. Again, it was the abstraction inherent in maps like Derby's that enabled such visions, and it was typically engineers, like Derby, who espoused them. To engineers, discrete bodies of water implied the eventuality of aqueous connections in the form of canals and aqueducts. For instance, in 1862, the engineer William Bryan, working with local Sacramento Valley boosters, proposed a quite detailed plan for a canal on the west side of the Sacramento Valley. Like most engineers of the period, Bryan

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<sup>26</sup> James Maurice Jensen, "The Development of the Central Valley Transportation Route in California to 1920" (Ph.D. diss., University of Southern California, 1965), 60-62.

<sup>27</sup> Jensen, "Central Valley Transportation," 79.

took the British irrigation works in India as a model, arguing that canals could serve the dual purposes of irrigation and navigation.<sup>28</sup> Similarly, as early as the 1850s, proposals had surfaced to link Tulare Lake with the San Joaquin River, and in the early 1870s construction was actually begun on an astoundingly ambitious irrigation-navigation canal in that in the San Joaquin Valley. Backed by San Francisco capitalists and laid out by a British engineer, the proposed 230-mile canal was to link Buena Vista Lake, at the southern end of the valley, with San Francisco Bay. In addition, a series of east-west canals would link the main canal with the San Joaquin River.<sup>29</sup> Engineers, boosters, and capitalists all envisioned large canals wending their way through the valley, bringing irrigation water to small farms while steamboats plied their surface with passengers and freight.<sup>30</sup>

The philosophers Giles Deleuze and Felix Guattari have written of the difference between what they term "striated" and "smooth" space. As they describe it, striated space is "counted in order to be occupied," while smooth space is "occupied without being counted." Striated space, in other words, has been measured, mapped, and prepared for

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<sup>28</sup> California Surveyor-General, *Annual Report 1862* (Sacramento, 1862), p. 27.

<sup>29</sup> For a summary of various irrigation/navigation plans in the nineteenth century, see Donald J. Pisani, *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1860-1930* (Berkeley: University of California Press, 1984), 78-101, on San Joaquin Valley canal, 107-120.

<sup>30</sup> "The Holland of California," *California Granger*, 1 November 1873.

colonization on the part of the state.<sup>31</sup> There is no doubt that the American state sought to create striated space out of smooth as part of the project of manifest destiny and western conquest. That, in fact, was George Derby's mission in California. But such an effort takes time: surveys must be funded, measurements taken, maps made and revised, roads and canals built, land claims ratified. In the meantime, the valley remained fairly "smooth," even if highly contested. Roads and routes were not well established; thus travelers moved in many different directions. Their traveling depended greatly on changes in nature, on instinct, and on sudden opportunities and decisions. One gold rusher described a situation in the Delta in which the ship's captain awoke on a foggy day unsure of the cardinal directions. Making a guess, the captain set sail, and it was only when a passing ship informed them of their direction that they realized they were headed back to San Francisco rather than to their intended destination of Sacramento.<sup>32</sup> Such an incident reveals the still chaotic and instinctual nature of travel. Moreover, most would-be miners were not at all certain of their destination. They arrived in the valley listening for rumors and information, hoping to determine in which direction the greatest profits might lie. Their choice of routes through the valley were made with unreliable information; they chose both destinations and routes based upon their own best guesses.

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<sup>31</sup> Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. B. Massumi (Minneapolis: University of Minnesota Press, 1987), 370-85. Their analysis is also usefully summarized in Casey, *The Fate of Place*, 303-308.

<sup>32</sup> Lewis C. Gunn and Elizabeth Le Breton Gunn, *Records of a California Family: Journals and Letters of Lewis C. Gunn and Elizabeth Le Breton Gunn*, ed. Anna Lee Marston (1928; reprint, Louisville, KY: Lost Cane Press, 1975), 60.

In Deleuze and Guattari's terminology, travel through smooth space is necessarily a kind of nomadism, in which one moves not only in accordance with cardinal directions or geometrically determined vectors but according to instinct, opportunity, and transient signs. More important than one's precise topographical location or route is the immediate means and methods of moving through a region. Moreover, smooth space requires and calls forth physical engagement with the landscape. Travel is not something that can be accomplished intellectually or passively -- by studying timetables and buying tickets -- but must involve the body and its multiple senses. In smooth space, one moves with awareness and intensity. Such was the experience of the valley in 1849.

As Deleuze and Guattari's analysis implies, however, travel is a means of constituting not only space but also a means of constructing identity. Smooth space creates nomads, while striated space helps to create and to maintain well disciplined citizens. At a somewhat less abstract level, the effort to impose certain forms, narratives, and understandings on the landscape is also an effort to construct identity in an unfamiliar location and society.

For instance, many accounts of traveling from this period construct the space of the valley as a frontier. The frontier is a stock form in Anglo-American writing.<sup>33</sup> It is always an untracked and somewhat dangerous wilderness into which a white man has stumbled and must make his way, but it is a world in which the skills and habits of

civilized life leave him only less fit and well-prepared for the journey. To succeed on the frontier inevitably requires the white man to "return" to a more primitive existence. This was the narrative construction of the valley employed by the journalist Bayard Taylor:

After traveling eight or ten miles the wagon trails began to scatter, and with my imperfect knowledge of prairie hieroglyphics, I was soon at fault....

The knowledge of tracks and marks is a very important part of the education of a woodsman. It is only obtained by unlearning, or forgetting for the time, all one's civilized acquirements and recalling the original instincts of the animal.<sup>34</sup>

As this passage suggests, detailed accounts of particular places -- their rivers, streams, trees, and even mosquitoes, are often implicated in much larger cultural projects. In Taylor's account, composed retrospectively, traveling through a "frontier" helps him to construct a particular masculine identity in which his own civilized superiority is at first threatened but ultimately bolstered by an uncivilized place. For Taylor, the concern is already the "over-civilization" of the middle-class white male. By constituting the valley

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<sup>33</sup> Richard Slotkin has provided the standard and most exhaustive analysis of nineteenth-century frontier narratives in *The Fatal Environment : The Myth of the Frontier in the Age of Industrialization, 1800-1890* (New York: Atheneum, 1985).

<sup>34</sup> Bayard Taylor, *Eldorado or the Adventures in the Path of Empire* (New York: Alfred A. Knopf, 1949). 174.

as a frontier, it becomes a space for the creation and reinforcement of a certain kind of Anglo-American masculine identity that amalgamates the primitive with the civilized.<sup>35</sup>

Of course not every moment of traveling, even in 1849, was difficult. And in those moments when the breeze held, the road was smooth, and the mosquitoes had mercifully disappeared, diarists recorded the valley as a much more pleasant place. These accounts construct the valley as a garden, the counterpoint of the frontier. When the environment did not immediately demand human work and energy, it could be experienced passively, as a *landscape*.<sup>36</sup> In those moments, the descriptions of middle-class writers emphasized the visual elements and beauty of the region. One traveler, for instance, recorded the beginning of a stagecoach ride out of Sacramento in rhapsodic prose:

The atmosphere was so soft and balmy that it was a positive enjoyment to feel it brushing over one's face like the finest floss silk. The sky was clear and cloudless, the bright sunshine warmed us put to a comfortable temperature; and we were traveling over such an expanse of nature that our progress, rapid as it was, seemed hardly perceptible....The scene all round us was magnificent....

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<sup>35</sup> E. Anthony Rotundo, *American Manhood: Transformations in Masculinity from the Revolution to the Modern Era* (New York: Basic Books, 1993).

<sup>36</sup> The literature on the construction of "landscape" is enormous. Some critical works include Denis Cosgrove, *Social Formation and Symbolic Landscape* (Totowa, N.J.: Barnes and Noble, 1984); W.G.T. Mitchell, *Landscape and Power* (Chicago: University of Chicago Press, 1994); and Doreen Massey, *Space, Place, and Gender* (Cambridge: Polity, 1994).

...We were upon an ocean of grass-covered earth, dotted with trees, and sparkling in the sunshine with the gorgeous hues of the dense patches of wild flowers....<sup>37</sup>

In such accounts the described landscape assumes the pastoral form.<sup>38</sup> It is experienced as pleasure, and it seemingly "invites" white settlement and occupation, by women as well as men. Anglo-Americans read the fertility of the soil and natural beauty of the land as indicators of their own future in California. As one writer remarked in this context, "The Anglo-Saxon blood will yet roll here as if in its first leap."<sup>39</sup>

Typically such renderings of the valley as either frontier or pastoral were made in retrospect, composed from the safety and comfort of a home or office. They invoked the Central Valley from a distance and reduced its multi-racial society and cultural complexity to narratives that were familiar to Anglo-Americans and which presumed eventual white settlement and control. These narratives offered a means of framing and controlling the alterity of an unfamiliar place. Constructing the Central Valley as a frontier implied its eventual conquest, while constructing it as a pastoral landscape implied its future settlement and cultivation. Both were ultimately narratives about

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<sup>37</sup> J.D. Borthwick, *The Gold Hunters: A First-Hand Picture of Life in California Mining Camps in the Early Fifties* ([1857] reprint: Cleveland: The Macmillan Company, 1917), 111-12.

<sup>38</sup> For a good recent discussion of the pastoral form, see Lawrence Buell, *The Environmental Imagination : Thoreau, Nature Writing, and the Formation of American Culture* (Cambridge, MA :: Harvard University Press, 1995).

<sup>39</sup> Colton, *Three Years in California*, 264.

Anglo-Americans and their special, even fated, relationship to the North American environment.

Yet despite the existence of such reassuring narratives about the valley, the difficulty of travel in the region in 1850 could more easily threaten, rather than bolster, familiar identities. One of the things that emerges in George Derby's account, for instance, is the belief that particular landscapes can be traversed and occupied only by certain groups, and that the environment of the Central Valley was perhaps not fully fit for whites. Unfamiliar with the particularities of the landscape and the best routes, relatively unskilled in swimming and canoeing, and unknowledgeable in utilizing the natural vegetation to construct rafts, immigrants often found it difficult to move in the valley, or at least to move quickly. From Derby's perspective, race, or more particularly Indianness, connoted the body's ability to move through the region with relative ease:

I was anxious to cross the [Kings] river...but was informed by the Indians, a large body of whom swam across to our encampment, that all the country in the vicinity was overflowed, and that it would be impossible to cross, even if we were to construct "balsas" of tulé owing to the rapidity of the current. It was evident enough that the country was overflowed, and as I found it impossible for anything but an Indian to get even to the bank of the river, I was reluctantly obliged to give up my idea of crossing at this point. I could see enough of the country, however...to satisfy myself that it would be a very unpleasant place for anything but an Indian to occupy.<sup>40</sup>

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<sup>40</sup> Derby, "The Topographical Reports," part 2, p. 259.

Here Derby recognized the local Indians' ability to swim and to negotiate the dense tulelands. It was only Indians who could even manage to approach the river, much less swim across it. Yet for Derby and others of his era, facility in the landscape was not merely the outcome of familiarity (and thus something that whites might eventually acquire) but an essential characteristic of certain racially defined groups. Race and place were tightly linked. While pastoral landscapes of trees and flowers indicated the inevitability of white settlement, the tulelands and drier portions of the San Joaquin Valley were unfit "for anything but an Indian to occupy." Only certain types of bodies were ultimately suited to this particular landscape.

It was not only race, however, but also gender that determined the relationship between body and environment. Derby, for instance, referred disparagingly to the women among a group of overland immigrants as "dirty and unhappy looking." The condescension in his account implied that their identity as white women was open to question, for the adjective "dirty" was used frequently and predictably in immigrant accounts to describe and delineate Native Americans in contrast to whites. It was, in fact, white women whose identities were most threatened by unfamiliar western environments.<sup>41</sup> In the Far West, and in Gold Rush California in particular, white women

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<sup>41</sup> As Annette Kolodny has pointed out, what women on the frontier feared most were precisely those changes in their bodies that might call into question their status as women -- ....While pastoral landscapes potentially offered a reinforcement of a domestic and female identity, frontiers reinforced only manhood while simultaneously threatening white womanhood. Annette Kolodny, *The Land Before Her: Fantasy and*

were synonymous with civilization -- their bodies, clothes, manners, and movements all symbolized the superiority of Anglo-American society and culture.<sup>42</sup> But the difficulties of travel in the Far West too often rendered white women ambiguous markers of the civilization they purported to represent.

The concern with dirt and dust was central to anxieties over travel in this period. Middle-class stagecoach passengers remarked almost without exception on the dust associated with this particular form of movement. For instance, the Scottish traveler J.D. Borthwick also noted the penetrating nature of dust. He remarked, with obvious distaste, that in summertime the "roads are ankle-deep in the finest and most penetrating kind of dust, which rises in clouds of smoke, saturating one's clothes, and impregnating one's whole system."<sup>43</sup> The seemingly obsessive concern with dust among a wide array of travelers points to the ways in which the interaction with and unfamiliar and supposedly uncivilized landscape invoked concerns over maintaining one's proper identity in a strange place. But while men complained of dust, it was white women who went to extreme lengths to insulate themselves from it. Elizabeth Le Breton Gunn, the wife of a Philadelphia newspaperman, Lewis Gunn, followed her husband to California in 1849 and took the stage from Stockton to Sonora. Gunn was at first pleasantly surprised to

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*Experience of the American Frontiers, 1630-1860* (Chapel Hill: University of North Carolina Press, 1984), 174.

<sup>42</sup> Here I am indebted to Inderpal Grewal's analysis of nineteenth-century Englishwomen who traveled in India. Grewal, *Home and Harem*, 93-94.

<sup>43</sup> Borthwick, *The Gold Hunters*, 112-13. Also Eduard Vischer, "A Trip to the Mining Regions in the Spring of 1859," trans. Ruth Frey Axe, *California Historical Society Quarterly* 11 (December 1932), 322.

find a "Newburyport stage in every particular" where she had expected nothing more than "a cart or some kind of wagon." She also found her companions pleasantly well appointed with "fine white shirts [and] fine cloth clothes." Nevertheless, once en route, Gunn too found the dust appalling:

I had on my green linen gown, straw bonnet and veil and I put my old red shawl on and pinned it up tight around my neck to keep out the dust, and it was hot enough to melt.<sup>44</sup>

Above all, Gunn, as a middle-class lady, wanted to keep the dust off her body – even at the expense of extreme discomfort. The problem with dust was its seeming ability to penetrate the body, rendering it a less reliable marker of white racial identity. The display of racial superiority amidst the racial and ethnic heterogeneity of nineteenth-century California was critical; one's determination and ability to keep one's body clean indicated that body's distance from nature.<sup>45</sup> As one (male) contemporary remarked, "The civilized woman is above all things a tidy woman."<sup>46</sup>

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<sup>44</sup> Gunn and Gunn, *Records of a California Family*, 142-44.

<sup>45</sup> On race and dirt, see David Montejano, *Anglos and Mexicans in the Making of Texas, 1836-1986* (Austin: University of Texas Press, 1987), 225-30. The concern with dust and dirt on the part of white women continued well into the railroad era. As one middle-class woman, writing of the railroad trip to California, put it, "Dust is the great foe to comfort on the Pacific Railroad. No brushing, no shaking removes it. It sifts, it penetrates, it pervades everywhere. After two or three days you grow to hate yourself." See Susan Coolidge, "A Few Hints on the California Journey," *Scribner's Monthly* 6 (May 1873), 27.

<sup>46</sup> Frederick Law Olmsted, "Public Parks and the Enlargement of Towns," in *Civilizing American Cities: A Selection of Frederick Law Olmsted's Writings on City Landscapes* (Cambridge, MA: MIT Press, 1971), 59.

The introduction of new, more industrialized forms of travel helped to mediate the relationship between bodies and environment in ways that operated to preserve social distinctions. While modes of travel are typically thought of in terms of how they altered spatial relationships -- by bringing places closer together and reducing distance, or what scholars have referred to as "time-space compression" -- equally, and perhaps more, critical for passengers were the ways in which forms of travel offered the potential both to segregate passengers from one another and to insulate them from the landscape through which they traveled.<sup>47</sup> Forms of mediation helped to ease anxieties raised by an unfamiliar land. The fact that different classes and races often traveled together did not, of course, render them equals, but it did raise anxieties, especially perhaps in pioneer communities, and particularly in Gold Rush California, where social segregation was not nearly so thorough as in more established places. Social divisions were harder to maintain in such an unstructured environment, in those places and times where the physical qualities of bodies were more important than their social qualities. This emerges repeatedly in early accounts of the mining era.<sup>48</sup> Many middle and upper class men who wrote about their experiences in California commented upon the extent to which men of all races and backgrounds were thrown together as they traveled through the valley to the

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<sup>47</sup> On time-space compression, see David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Cambridge, MA: Blackwell, 1990); Stephen Kern, *The Culture of Time and Space, 1880-1918* (Cambridge, MA: Harvard University Press, 1983); and William Cronon, *Nature's Metropolis: Chicago and the Opening of the West* (New York: Norton, 1991), 63-93.

<sup>48</sup> Susan Lee Johnson, *Roaring Camp: The Social World of the California Gold Rush* (New York: Norton, 2000); Brian Roberts, *American Alchemy: The California Gold Rush and Middle-Class Culture* (Chapel Hill: University of North Carolina Press, 2000).

mines, suggesting the novelty and personal significance of the experience. While some reveled in the novelty, others were pointedly uncomfortable.<sup>49</sup> Theodore Johnson was one of the latter. Describing his experience of warping his boat up the Delta alongside other ships in the same predicament, he referred to the passengers of a nearby ship as being "from *below* in more senses than one...." But the differentiation Johnson made between himself and these other men were undoubtedly less obvious than he might have liked. After all, he found himself engaged in the same difficult labor as those "from below." Moreover, as Johnson admitted, once they had gone ashore he was "surrounded by Peruvians, Chileans, Mexicans, Kanakas, and our countrymen; as well as Europeans of every kind, class, and description."<sup>50</sup>

Industrialized travel, however, provided a public space in which the social significance of differently marked bodies could begin to be taken into account. While railroads, steamboats, and stagecoaches both brought people of different backgrounds together, they also separated them into categories based on their ability to pay, their race, and oftentimes their gender. That modes of travel were associated with class was patently obvious. If one failed to recognize this, her ticket would make the point clear. Even on stagecoaches, which offered few comforts, the most distinguished passengers

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<sup>49</sup> On reactions to class and racial mixing among the 49ers, see Roberts, *American Alchemy*, 145-46.

<sup>50</sup> Theodore T. Johnson, *Sights in the Gold Region and Scenes by the Way* (New York: Baker and Scribner, 1849), 115, 129-30.

were often allowed to sit with the driver.<sup>51</sup> It was the arrival of larger steamboats in California, however, that made possible the class distinctions that travelers such as Theodore Johnson desired and expected. For one thing, steamboats dramatically speeded the trip up the Delta, reducing a journey of several days to only a few hours, for those who could afford the fare. Thomas Kerr, who complained of the blisters and difficulty of warping his boat, confided to his journal that he "envied those on a steam Boat that went up the river in the morning and another going down at sun set."<sup>52</sup> Those who rode on steamboats obviously did not suffer from blisters. The savings of both time and energy were particularly significant in a region that was short of labor. But even for those lucky enough to be on board, steamboats often provided an internal geography that substantiated the social hierarchy during the process of travel. The space of the steamers enclosed certain social relationships, and re-established familiar social hierarchies that seemed not to obtain in much of Gold Rush California.<sup>53</sup> Chinese passengers, for instance, found themselves at the bottom of both the hierarchy and the boat, confined to the "China hold" in the forward end of the hull, adjacent to the machinery spaces.<sup>54</sup> Middle and upper class whites, on the other hand, occupied the more privileged spaces,

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<sup>51</sup> Oscar Osburn Winther, *The Transportation Frontier: Trans-Mississippi West, 1865-1890* (New York: Holt, Rinehart and Winston, 1964), 65.

<sup>52</sup> Kerr, "An Irishman in the Gold Rush," 19.

<sup>53</sup> For an exemplary analysis of how the space of a ship encompasses power and social relationships, see Greg Denning, *Mr. Bligh's Bad Language: Passion, Power and Theatre on the Bounty* (Cambridge: Cambridge University Press, 1992), 19-33.

<sup>54</sup> Jerry MacMullen, *Paddle-Wheel Days in California* (Stanford: Stanford University Press, 1944).

and typically had access to the higher decks as well as a dining room. By the late 1860s, some Californians could book their own staterooms for the trip upriver.<sup>55</sup> One such middle-class traveler was none other than Elizabeth Le Breton Gunn, who in a letter home described with obvious satisfaction her experience of traveling on a river boat up the Delta and San Joaquin River. Gunn lavished particular attention on the superb meals available to those with first-class tickets. "At tea we had meats of all kinds and cooked in all fashions," Gunn wrote, "tea cakes, bread and crackers, tea and coffee and elegant Chinese preserves, and milk and sugar of course."<sup>56</sup> Food as well as space helped to demarcate social position while one was en route.

Yet stages and steamboats, although imposing a limited organization upon both space and people, never fully succeeded in dissociating travel nor in insulating the body from nature.<sup>57</sup> Although stages supposedly ran on a schedule, published timetables and routes for stage travel reflected the appearance of striated and controlled space more than its reality. Typically, stages were hours, and often days off schedule. They were delayed by tired horses, washed out roads, and abandoned ferry points. Nature continually intervened, and travel remained unpredictable.<sup>58</sup> In the San Joaquin Valley, for instance,

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<sup>55</sup> MacMullen, *Paddle-Wheel Days*, 82; Winther, *The Transportation Frontier*, 86.

<sup>56</sup> Gunn and Gunn, *Records of a California Family*, 140.

<sup>57</sup> On the effect of trains in dissociating people and things from the landscape, see Cronon, *Nature's Metropolis*, 78-79. On the ways in which nature continued to intervene in certain forms of industrialized travel, see Kathryn Taylor Morse, "The Nature of Gold: An Environmental History of the Alaska/Yukon Gold Rush" (Ph.D. diss., University of Washington, 1997).

<sup>58</sup> Waterman L. Ormsby, *The Butterfield Overland Mail*, ed. Lyle H. Wright and Josephine M. Bynum (San Marino, CA: The Huntington Library, 1942), 118; Wheat, ed., *The Shirley Letters*, 9.

routes were confined to the drier foothill regions, and even so, the high water year of 1862 pushed at least one company out of operation after its routes were washed out.<sup>59</sup> And while stages shifted the principal labor from the human body to the animal, allowing longer distances to be covered, stagecoach travel was nonetheless still too physical and fatiguing for many middle-class passengers, who were already accustomed to steamboats and railroad cars. Similarly, descriptions of stagecoach travel repeatedly point to the experiences of fatigue and dust, as well as to the very real physical risks that passengers encountered on difficult routes.<sup>60</sup>

Steamboats also remained subservient to the particularities of the landscape. Most obviously they were confined primarily to the natural watercourses (despite the visions of boosters and engineers), and depended upon streamflow levels and, in the Central Valley, upon tides. In high-water years, navigation was extended further upstream, while low-lying roads were washed out. In low-water years, navigation contracted and the result could be the abandonment of a now isolated town. This was the case with Tuolumne City, a landing that served briefly as the head of navigation on the Tuolumne River (a tributary of the San Joaquin) during high water. Low water in 1851 made it impossible to reach the town, and then, the following season, a steamboat got hung up on a bar at the landing. Henceforth steamboats avoided the town, and settlers

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<sup>59</sup> William Harland Boyd, "The Stagecoach in the Southern San Joaquin Valley, 1854-1876," *Pacific Historical Review* 26 (November 1957), 365-71.

<sup>60</sup> Ormsby, *The Butterfield Overland Mail*, 124; Wheat, ed., *The Shirley Letters*, 9.

gradually abandoned the isolated settlement. Moreover, the boat itself mediated interactions with the landscape; nonetheless, passengers remained well aware of the particularities of the river: its relative depth, the location of bars, the influence of tides. Steamboat pilots pointed to the continuing physical engagement with the river that their profession required in the Central Valley. The shallow water and numerous bends of the San Joaquin, in fact, made that river particularly treacherous, so that it required both familiarity and hard physical work on the part of the crew. The necessity of running the boats up onto bars and then slowly "wallowing" them across made the trip physically unpleasant for everyone aboard.<sup>61</sup> But even when the boats moved on open water, some passengers still complained of the discomfort. Californian J. Ross Browne, for instance, lamented the "convulsive vibrations" as well as the "strong smells of grease, whiskey, and machinery."<sup>62</sup>

It was with the construction of railroads, however, that Californians raised to a new level the mediation between travelers and the landscape. To the extent that the goal of industrialized travel was to overcome natural obstacles to movement, the railroad was decidedly more successful than earlier forms of transportation had been. The most critical technological innovation utilized by railroads in the valley was steel bridges, which allowed the railroad to traverse rivers, streams, and marshlands without being subject to repeated washouts. This allowed, in Wolfgang Schivelbusch's phrase,

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<sup>61</sup> Frank F. Latta interview with William Atthowe, 1952. Frank Latta Papers, Huntington Library.

<sup>62</sup> Cited in Winther, *The Transportation Frontier*, 88.

"mechanical regularity [to triumph] over natural irregularity."<sup>63</sup> The irregularities of the natural terrain -- reflected, for example, in the winding stagecoach routes of the foothills and numerous bends in the rivers -- were replaced by the uncompromising linearity of the railroad route.

This linearity was nowhere more evident than in the San Joaquin Valley where the flat landscape enabled an almost perfectly straight route. Moreover, those who controlled the Southern Pacific Railroad spurned existing human geographies in favor of the most economic routes. In a well-known incident, the railroad bypassed the San Joaquin Valley town of Visalia -- a county seat and one of the most populous towns in the region. Instead, the railroad corporation laid out a entirely new town, Tulare City, several miles to the southwest.<sup>64</sup> In fact, like Tulare City many of the railroad towns in the San Joaquin Valley were new towns, placed on a map at convenient intervals for the railroad and in locations where land could be obtained most cheaply. More often than not these railroad towns bore no particular relationship to natural geography or human

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<sup>63</sup> Wolfgang Schivelbusch, *The Railway Journey: The Industrialization of Time and Space in the Nineteenth Century* (1979; reprint: Berkeley: University of California Press, 1986), 23.

<sup>64</sup> Some authors have speculated that the Southern Pacific actually sought to punish Visalia for the earlier failure of the county to pass a bond issue to help fund railroad construction. See Clarence M. Wooster, "Building the Railroad Down the San Joaquin in 1871," *California Historical Society Quarterly* 18 (March 1939), 22-31.

history. They were laid out in identical fashion in which economic considerations were paramount.<sup>65</sup>

The railroad created new spatial relationships while erasing older geographies of travel. Railroad towns often siphoned off the business and population of older towns along the river. Moreover, railroad guides from the 1870s and 80s offer only the briefest and most bland descriptions of the valley. A space that had, less than three decades earlier, been measured by the energy required to cross it had become almost invisible to those who traveled through it on the railroad. Yet as trains made movement immeasurably easier, they somewhat ironically also raised new concerns about the vulnerability of travelers' bodies. While the specter of industrial accidents posed undeniable and unmatched threats to the body, much of the literature on railroad travel focused not on the potential for serious accidents but merely on discomfort. For instance, an English health manual published in the United States in the 1880s cautioned readers about the supposed health threats posed by railroad travel:

There is pulling at the eyeballs on looking out of window; a jarring noise, the compound of continuous noise of wheels, and this conducted into the framework of the compartment; with the obligato of whistle and of the brake dashing in occasionally, and always carrying some element of annoyance, surprise, or shock; there is the swaying of the train from side to side, or the jolting over uneven rails and ill-adjusted points; and the

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<sup>65</sup> Wooster, "Building the Railroad"; Richard Harold Smith, "Towns Along the Tracks: Railroad Strategy and Promotion in the San Joaquin Valley, California" (Ph.D. diss., University of California at Los Angeles, 1976), 121-52.

general effect of these upon the temper, the muscles, and the moral nature.<sup>66</sup>

Such descriptions reveal perhaps as much about perceptions of middle-class bodies as they do about mid-nineteenth century trains. Wolfgang Schivelbusch has argued that industrialized travel exacted real physical and psychological tolls upon nineteenth-century travelers, but perhaps the more significant point is that industrialized travel allowed for a level of self-consciousness and self-involvement that had not been previously possible while traveling in new environments. Rather than engaging with the environment, middle-class travelers focused considerable attention on the effects of railroad travel on their own selves. Railroad companies responded to this hyper self-consciousness by advertising their claim that travel in a well-appointed railroad car was akin to being in one's drawing room at home, except for the pleasant change of scenery. Moreover, they emphasized the way in which the body itself was insulated from the effects of travel on the best trains. Straight tracks, they assured prospective passengers, avoided unpleasant swinging motions and sidelong bumps. Buffers further cushioned the ride and insulated the body against unwanted motion, and elaborately upholstered interiors offered psychological as well as physical comfort. The result was a trip that could be accomplished "with absolutely no fatigue or discomfort."<sup>67</sup> Passengers often

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<sup>66</sup> J. Russell Reynolds, "Travelling: Its Influence on Health," in *The Book of Health*, ed. Malcolm Morris (New York, 1884), 581. This passage is also cited in Schivelbusch, *The Railway Journey*, 118.

<sup>67</sup> Henry T. Williams, *The Pacific Tourist; Williams' Illustrated Trans-Continental Guide of Travel....* (New York: Henry to. Williams, 1876), 8. On the accommodations of railroad cars and passenger responses, see

confirmed such claims. One woman, writing in *Scribner's*, commented favorably on the slow pace of the Pullman cars, "the quiet, the absence of clatter, the being able to talk without raising the voice," all of which she found a "surprising relief."<sup>68</sup> Whereas Derby and other early travelers complained of thirst and fatigue, and the foul taste of the southern valley's alkaline water, railroad travelers were likely to write of the pleasures of a well laid table. In fact, what made traveling "first class" so, was the extent to which it seemed not like traveling at all.

By the 1880s, the major points of interest for the railroad tourist on a trip through the Central Valley were meal stations and junction points. Interaction with the landscape was reduced, at least in ideal cases, to the sense of vision -- the scenery rushing by the passenger window. In such a situation, most of the body became less essential to experience. The visual qualities of the landscape are less directly linked to the body. They can be observed from a distance, without direct interaction. And vision, not coincidentally, is the sense most likely to convey the impression of subjective autonomy and detachment.<sup>69</sup> After all, the railroad advertised itself to middle-class tourists as akin to a drawing room.

The result was that the traveler became less aware of and less connected to the landscape through which she passed. Features that held tremendous significance for early

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August Mencken, *The Railroad Passenger Car: An Illustrated History of the First Hundred Years with Accounts by Contemporary Passengers* (Baltimore: Johns Hopkins University Press, 1957).

<sup>68</sup> Coolidge, "A Few Hints on the Journey," 28.

<sup>69</sup> Merleau-Ponty, *Phenomenology of Perception*, 320.

travelers on foot or horseback became unimportant and often overlooked sights. Referring to the hog wallows of the southern San Joaquin Valley which George Derby had complained about in his report, one railroad guide asserted simply that the "sand dunes" would attract momentary attention and went on to describe them as "queer little hills."<sup>70</sup> They had become a visual curiosity rather than an obstacle to movement, suggesting the extent to which the railroad now mediated the connection between landscape and bodies. As travel became regularized and industrialized, bodily interaction with the landscape was curtailed. The sensual and social complexity of the landscape that emerged in early travel accounts has no place in the literature of the railroad. Whereas travelers such as George Derby and Thomas Kerr foregrounded their own bodily interaction with the landscape, railroad passengers focus on their physical interaction with the railroad car. Knowledge of the environment is produced not with the entire body, but almost exclusively through vision.

The sense of space produced by such forms of traveling would inevitably be less individual and more abstract. Routes were not a matter of either nature or individual choice, but were determined by railroad executives and engineers. And for most travelers, their experience of the valley's environment would be reduced to the immediate vicinity of the railroad track. While insulating the middle-class body from the particularities of nature and of place, industrialized travel also erased much of the

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<sup>70</sup> Stanley Wood, *Over the Range to the Golden Gate: A Complete Tourist's Guide to Colorado, New Mexico, Utah, Nevada, California, Oregon, Puget Sound and the Great North-West* (Chicago: R.R.

particularity of places. The insulation of bodies had as its corollary the abstraction of space. By rendering routes of travel regular and reliable, and by controlling and shaping experience in certain ways, industrialized travel also rendered the experience of places, and thus places themselves, increasingly homogeneous. Meanwhile, middle-class identities could be continually reinforced by surroundings that mimicked a drawing room and ensured passengers' comfortable distance from the landscape. The goal of such middle-class travel was to reproduce and to maintain the trappings of middle-class life amidst different external circumstances, to encounter natural and social difference and yet to maintain one's distance from it.

By the 1860s, accounts of traveling in the valley are exceeded by accounts of settling. As the promise of the mines gave out, many immigrants turned their attention toward farming on the valley floor. Although the first American agricultural settlers had arrived in the 1840s, significant settlement only began in the late 1850s. And whereas travel had been the norm in the region during the Gold Rush, gradually there would arise a community of people who asserted the necessity of white settlement. These settlers would claim that the valley was a center, rather than merely a periphery of the mines, and they would struggle to make it so.

Most of the major environmental transformations worked upon the valley would come from those who intended to stay put: the diking and leveeing of the rivers, the

construction of irrigation works, the wholesale introduction of new plants and animals, and the eradication of many native California species. Most significantly, unlike railroad travel, settling in the valley required an ongoing engagement with this new environment and a commitment to trying to understand its intricacies. If the ability to travel and to move in certain landscapes was circumscribed by the qualities of bodies or, alternatively, if such travel potentially threatened racial or gender identities, then landscapes like the Central Valley would have to be remade in order to allow for white occupation and settlement. One way of accommodating and containing the racial and ethnic mixture of the West was to impose a civilized form upon the landscape that would help to spatialize a desired social order. The reworking of nature was an essential, and often the essential, part of this social and cultural project. It was critical that the landscape be made more amenable, both physically and culturally, to supposedly civilized persons. For many, the question became how a landscape that so often threatened Anglo-American bodies and identities might be remade into one that reinforced and sustained those very same bodies and identities.

## *Chapter Two*

### **Labor**

The contemporary landscape of the Central Valley contrasts dramatically with that encountered by mid-nineteenth century travelers. Moving through the valley now, one encounters a vast agricultural plain interrupted by the metropolises of Redding, Sacramento, Stockton, Fresno, and Bakersfield. Although today the valley is the state's most rapidly urbanizing region, it remains primarily an agricultural landscape. Agriculture in California constitutes the states' second largest "industry," and it is centered here. Many claim that the region comprises the most productive agricultural landscape in the world. It unquestionably produces an impressive array of agricultural goods: citrus, nuts, grapes, cotton, beets, vegetables, alfalfa. Meanwhile, the environments that so frustrated and delighted early travelers in the valley -- tule lands, hog wallows, gopher-pocked grasslands, oak woodlands, and wildflower-covered prairies -- are now extremely difficult to find, often existing only in isolated parcels within wildlife refuges, state parks, or private reserves. The valley's landscape has undergone a startling transformation in the last century and a half. Most of that transformation has been purposeful, the result of large amounts of human labor.

Labor has transformed not only the material nature of the valley, however, but also our own understanding of it. Like travel, labor is one of the principal activities that produces space -- that is, it gives us knowledge of the spatio-temporal dimensions in which we live. As emphasized in the preceding chapter, places come to be experienced and known through bodily actions, and, at least in the nineteenth century, most of these actions were connected with either travel or work. While travel brings human beings into contact with new surroundings, it is labor that reorganizes space so that it conforms to human needs, both biological and social.

Moreover, labor, like travel, shapes personal and social identity. It was principally through labor that nineteenth-century individuals understood both their own bodies and their relationship to non-human nature. For scholars, a focus on labor and work provides a means of reconnecting bodies and places, of showing how environmental knowledge depends upon the body, and how knowledge of the body often emerges from the work of environmental transformation.<sup>1</sup>

Here I focus on agricultural labor, the work of changing the valley from a still relatively wild, or at least uncultivated, space into an agrarian landscape. This was the principal human activity taking place in the region in the latter half of the nineteenth century. In an attempt to uncover the cultural terms through which individuals understood the process of environmental transformation, this chapter examines the most

important discourse about labor and landscape in nineteenth-century California -- agrarianism.

Agrarianism is perhaps an overused term in much writing on the western United States. It is often deployed uncritically, as a nostalgic alternative to the modern capitalist culture that we now inhabit, loosely invoking the Jeffersonian notion of a society based upon the presumed virtue and independence of small-scale farmers.<sup>2</sup> Most nineteenth-century Americans did share certain Jeffersonian assumptions about the centrality of agricultural labor to the American nation, but, at the same time, agrarianism in California was a complex discourse that interwove ideas about the environment, politics, and human beings in ways that were particular to the late nineteenth-century West. Part of my goal in this chapter is to refrain from reading agrarianism simply as a counterpoint to “modern capitalism” or “industrial agriculture,” and to recover some of the complexity of this ideology as it exists in nineteenth-century sources.

In important recent books, both Ian Tyrell and David Vaught have begun to illuminate cultural perceptions of the agricultural landscape in California by focusing more closely on nineteenth-century fruit growers. Writing against an existing literature that stresses the capitalist and commodifying impulses of rural Californians in this period, Tyrell in particular emphasizes how moral and social concerns shaped reactions to the

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<sup>1</sup> For an example of how a focus on labor can reveal the connections between human and natural history, see Richard White, *The Organic Machine: The Making and Unmaking of the Columbia River* (New York: Hill and Wang, 1995).

landscape, undergirding a movement that he labels “environmental improvement.” Tyrell describes a movement of environmental reform that predominated among at least certain groups of California agriculturists, who argued alternately for both environmental preservation and an environmentally conscientious transformation of the landscape.<sup>3</sup> Thus, even while American farmers are typically considered, in the words of another historian, “a dominant force in the shock wave of environmental devastation that spread west across the continent,” it is important that we not conflate retrospective assessments with contemporaries’ understandings of their own actions.<sup>4</sup>

Like Tyrell, I take the rhetoric of nineteenth-century California agrarians and farmers seriously. My interest lies in uncovering how they understood their own relationship to the landscape, how they constructed both bodies and places. Their rhetoric, although often overblown and always self-congratulatory, suggests that embedded within their agrarian ideology was the notion that reciprocity structured the relations between human beings and landscape. That is, contrary to the idea that nineteenth-century agriculture was a manifestation of the desire to conquer and dominate the land, agrarianism can be better understood as a discourse about the interaction and

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<sup>2</sup> Charles A. Miller, *Jefferson and Nature: An Interpretation* (Baltimore, MD: Johns Hopkins University Press, 1988), 201-16.

<sup>3</sup> Ian Tyrell, *True Gardens of the Gods: Environmental Reform in California and Australia, 1860-1930* (Berkeley: University of California Press, 1999); David Vaught, *Cultivating California: Growers, Specialty Crops, and Labor, 1875-1920* (Baltimore: Johns Hopkins University Press, 1999). In another recent book, Richard Judd makes some similar observations based on nineteenth-century farmers in New England. See Judd, *Common Lands, Common People: The Origins of Conservation in Northern New England* (Cambridge, MA: Harvard University Press, 1997).

relationship between human labor and the larger natural world.<sup>5</sup> Nineteenth-century agrarians recognized, in a way that many contemporary Americans do not, that places and bodies were intimately connected, that they "produced" one another. This relationship between laboring human beings and nature was much easier to see in the nineteenth century than in our own. When most Americans still lived on farms and worked outdoors, the connection between human labor and landscape was obvious. Labor was measured by environmental transformation: how many trees cleared, how many acres plowed, how many miles of irrigation ditch dug. At the same time, the quality of the landscape could be measured by the amount of human labor required to effect that transformation. Good land required little, or at least less, work. Labor and environment were measures of one another.

But it was not merely the land that was transformed; the relationship operated in both directions. As human labor transformed the environment, human beings, typically understood quite exclusively as white men, were themselves transformed by the process of laboring. As Thomas Jefferson had argued one hundred years earlier, it was through agricultural labor that human beings might acquire and retain the desirable characteristics of republican citizenship, including independence and moral probity. As he wrote, "Man

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<sup>4</sup> Judd, *Common Lands*, 59. Judd, however, is equally critical of this view.

<sup>5</sup> On conquest and colonization, see Patricia Nelson Limerick, *Legacy of Conquest: The Unbroken Past of the American West* (New York: Norton, 1987); Frieda Knobloch, *The Culture of Wilderness: Agriculture as Colonization in the American West* (Chapel Hill: University of North Carolina Press, 1996); William Robbins, *Landscapes of Promise: The Oregon Story, 1800-1940* (Seattle: University of Washington Press, 1997).

...is habituated to labour and formed by it."<sup>6</sup> Nineteenth-century Californians still held to this Jeffersonian logic, and, more so than Jefferson, they emphasized that agricultural labor brought physical benefits to the laborer -- health, virility, longevity. Agricultural labor improved the landscape on the one hand, and the moral nature and bodies of men on the other.

But such subjective transformations were presumed possible only for white men. Within the context of nineteenth-century culture, both women and non-white men were marked by their perpetual dependence and inferior bodies, which even agricultural labor could not necessarily change.<sup>7</sup> White women had an appointed role in agrarian society, a role defined by the ideology of separate spheres and domesticity. Non-whites, on the other hand, were not part of their cultural vision. As I hope to show, agrarianism cannot be understood apart from nineteenth-century racism and the corresponding desire to create racially exclusive spaces in the trans-Missouri West. Agrarianism linked the landscape with race and gender in ways that fit nicely with nineteenth-century Anglo-American desires and ideologies of dominance.<sup>8</sup> The process of racialization in

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<sup>6</sup> Thomas, Jefferson, *Notes on the State of Virginia* (1785; reprint, New York: Penguin, 1999), 65.

<sup>7</sup> Thomas Jefferson had maintained that Native American men might also be capable of this independence, but Jefferson's more optimistic assessments of Indian potential had given way to vehement racism by the late nineteenth century, particularly in California. For Jefferson's views on Indian potential, see *Notes on the State of Virginia*, 61-68; Miller, *Jefferson and Nature*, 65.

<sup>8</sup> Whereas over the last decade labor historians focused on the urban Northeast have confronted the centrality of racism and the aspiration for white identity to the culture of the white working class and, in consequence, let got of an earlier and more romanticized portrait, agricultural and environmental historians have yet to acknowledge fully the centrality of racism to the agrarian vision in their histories of the western U.S. The exception to this is Neil Foley's recent social history of Texas cotton farming, *The White Scourge: Mexicans, Blacks, and Poor Whites in Texas Cotton Culture* (Berkeley: University of California

California was intertwined with conceptions of the natural environment and its inherent possibilities.<sup>9</sup>

Nineteenth-century agrarian discourse located economic and social wealth in the natural environment. Agrarians emphasized the ways in which human beings cooperated with nature in order to harness "natural" wealth. In contrast to the urban discourse of "producerism," which stressed that human labor was the ultimate source of wealth, most nineteenth-century Californians repeatedly asserted the value and wealth of the landscape. A historian barely enters the archive before encountering such sentiments. They appear in newspaper accounts, agricultural society proceedings, and personal memoirs. Describing the benefits of California's climate and soil, for instance, Senator A.A. Sargent remarked to his audience at the Agricultural Society meeting in 1870 that "compared with many of the territories that have grown into states...California, in location, climate, productiveness, in all natural advantages, is far superior." Or, as another speaker declared, "Nature seems to have marked out this country as the special

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Press, 1997). For work on racism and the urban working class, see David R. Roediger, *The Wages of Whiteness: Race and the Making of the American Working Class* (New York: Verso, 1991); Noel Ignatiev, *How the Irish Became White* (New York: Routledge, 1995); Alexander Saxton, *The Rise and Fall of the White Republic: Class Politics and Mass Culture in Nineteenth-Century America* (New York: Verso, 1990).

<sup>9</sup> Although in this chapter I focus on the ways in which white identities were tied to the Central Valley landscape, other racial and ethnic groups also utilized the landscape to foster collective identities. See Karen Leonard's article on Asian immigrants to California, "Finding One's Own Place: Asian Landscapes Re-visioned in Rural California," in *Culture, Power, Place: Explorations in Critical Anthropology* (Durham: Duke University Press, 1997), ed. Akhil Gupta and James Ferguson, 118-36.

paradise of agriculturists....”<sup>10</sup> Others cautioned against attributing prosperity in California solely to its (Anglo) inhabitants, pointing out that while human contributions were significant, the "true" cause of California's greatness lay in the provisions of nature: "a genial climate of unparalleled salubrity," "soil of unexampled fertility, diversified with beautiful plains, enchanting valleys, undulating hills and rugged mountains -- the whole being washed on one side by the Pacific Ocean, with its healthful breezes, and intersected by navigable streams from the mountains to the sea."<sup>11</sup> Such allusions to California's "natural" wealth were commonplace in this period, and it is easy to write them off to empty boosterism. Yet they are significant because they indicate a quasi-physiocratic understanding of labor and economics.<sup>12</sup> In the physiocratic view, agriculture was the *only* productive activity, and nature itself was the source of all wealth. Labor, of course, was necessary to harness the wealth of the landscape, but it was not the labor of the farmer *per se* that created value -- his skill merely unlocked value inherent in the earth. Other human economic activities such as manufacturing might well have positive results, but they were not, in themselves, productive. They merely transformed the wealth which

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<sup>10</sup>California State Agricultural Society (CSAS), *Transactions 1868-69*, p. 11.

<sup>11</sup>J.B. Crockett, "Annual Address Delivered before the State Agricultural Society, September 21, 1868," CSAS *Transactions 1868-69*, p. 75.

<sup>12</sup>For a brief description of the French Physiocrats and their philosophy, see Stephen Gudeman, *Economics as Culture: Models and Metaphors of Livelihood* (London: Routledge and Kegan Paul, 1986), 71-90. Also Elizabeth Fox-Genovese, *The Origins of Physiocracy: Economic Revolution and Social Order in Eighteenth-Century France* (Ithaca: Cornell University Press, 1976). Several authors have pointed to the extreme psychological investment in the landscape on the part of nineteenth-century migrants to Californians. Although physiocratic ideas were in no sense limited to California in this period, it may be that they were more pronounced. See David Wyatt, *The Fall into Eden: Landscape and Imagination in*

had been harnessed through agriculture. If the landscape were not inherently "wealthy," its inhabitants, no matter how industrious, could not make it so.

During the Gold Rush, many observers, in their enthusiasm for the mines, had disparaged California's agricultural potential.<sup>13</sup> But this had begun to change by the late 1850s. As the placers gave out and would-be miners turned to farming, commentators began to view the state's agricultural potential much more favorably.<sup>14</sup> Wheat acreage expanded rapidly over this period, and initial experiments with fruit growing had also been quite promising.<sup>15</sup> Many observers began to reevaluate the treeless plains of the Central Valley, initially viewed as unsuitable for agriculture, as potentially fertile land. A legislator from Yuba County propounded this new optimism in a speech before the State Agricultural Society in 1861, in which he asserted that the "seemingly barren plains were all productive, and highly so, requiring only the application of labor and science."<sup>16</sup>

The belief that wealth inhered in the landscape emerged repeatedly in the two decades following the Gold Rush, typically in debates over the long-term value of mining to the state. Despite the fact that California's early wealth came overwhelmingly from

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*California* (New York: Cambridge University Press, 1986). David Goodman, *Gold Seeking: Victoria and California in the 1850s* (Stanford: Stanford University Press, 1994), 140-43.

<sup>13</sup> For example, one traveler to California in this period wrote: "[California] is not the country which agriculturists would select. Her whole mining region is barren; nature rested there with what she put beneath the soil." Walter Colton, *Three Years in California* (New York: A.S. Barnes & Co., 1850), 371.

<sup>14</sup> Imre E. Quastler, "American Images of California Agriculture, 1800-1890," (Ph.D. dissertation, University of Kansas, 1971); Richard Eigenheer, "Early Perceptions of California Agriculture," (Ph.D. diss., University of California at Davis, 1976), 237-38, 244.

<sup>15</sup> California Surveyor-General, *Annual Report 1856* (Sacramento, 1857), 256.

<sup>16</sup> D.E. DeLong, "Annual Address," *CSAS Transactions 1861*, p. 150.

gold, most nineteenth-century Americans were not sure whether precious metals actually constituted wealth in a fundamental sense. Contemporaries frequently contrasted agriculture to both the mining industry itself and to the urban capitalism that it had spawned in San Francisco. Critics of mining argued that it was only agriculture which represented “true” wealth and the potential for long-term economic prosperity. Such arguments gained considerable weight as mining receipts plummeted at the end of the 1850s. In the wake of such economic shifts, many argued that miners confused actual wealth with its signifier.<sup>17</sup> As Samuel B. Bell told the State Agricultural Society in 1858, “Gold is not wealth...Agriculture is the prolific mother of wealth.”<sup>18</sup> Others, however, were willing to grant the reality of mineral wealth, but they still pointed to its non-renewable nature and to the fact that profits from mining were quickly transported out of the region and failed to contribute adequately to the long-term development of California, a fact that seemed all too obvious in the central regions of the state. For such development, Californians would have to look to agriculture. A speaker before the Agricultural Society in 1868 argued that:

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<sup>17</sup> Goodman, *Gold Seeking*, xvii-xx. For a discussion of gold, nature, and conceptions of wealth in the late nineteenth century, see Katherine Taylor Morse, “The Nature of Gold: An Environmental History of the Alaska/Yukon Gold Rush,” (Ph.D. diss., University of Washington, 1997), 1-51. For a discussion of the economic cycles associated with gold mining in California, see Robert Kelley, *Gold vs. Grain: The Hydraulic Mining Controversy in California's Sacramento Valley* (Glendale, CA: Arthur H. Clark Co., 1959), 21-56.

<sup>18</sup> CSAS *Transactions 1858*, p. 57.

Long after our mines shall have been exhausted, when quartz mills and crushers, "long toms" and rockers, flumes and sluices, amalgamating pans and roasting furnaces, shall...be remembered only as things of the misty past...our waving fields of grain, our vine-clad hills, our countless herds dotting the mountains and valleys...our teeming orchards and blooming gardens, will present a scene of rural beauty and of agricultural wealth which no other country can rival.<sup>19</sup>

Speakers such as this gave voice not only to familiar agrarian rhetoric but also expressed the anxiety that many Californians felt about the region's post-mining future. By the mid-1860s, Anglo-Californians were commenting on the long-term effects of mining, connecting economic decline with environmental destruction. As one writer lamented, "Nature must needs recognize, that gold and desolation go together."<sup>20</sup> Such sentiments only became more common as agriculture began to challenge mining as the state's principal economic activity. For instance, one spokesman before the California State Agricultural Society in 1869 told his audience:

Remember that agriculture is the chief source of the nation's wealth. Commerce exchanges it. Manufactures only improve its quality. But agriculture is the productive power that multiplies it. Without the farmer

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<sup>19</sup> Crockett, "Annual Address," 76. Also, "Agriculture: The Future," *California Farmer and Journal of Useful Sciences* 1 (5 January 1854), 2. Until the 1870s, criticisms of mining were somewhat muted by the fact that California's economy was still only regional. Farmers, particularly those in the Sacramento Valley and foothill regions, depended upon the mining districts to buy their products. Kelley, *Gold vs. Grain*, 84.

<sup>20</sup> Horace Bushnell, *California: Its Characteristics and Prospects* (San Francisco: Whitton, Towne and Co., 1858), 15.

the loom would stand idle, the mill cease to hum, the locomotive rust on the iron rail and the great ships drop to pieces in the harbor. Without agriculture, in fact, these great symbols of utilitarian invention and activity could never have come into existence.<sup>21</sup>

Agriculture, however, was not merely the economic foundation of society; it was its social foundation as well. Agriculture, nineteenth-century white Americans agreed, was the hallmark of civilization itself. As a contributor to the *Pacific Rural Press* in 1871 wrote, "It is safe to assume that the degree of a nation's progress in civilization is nearly indicated by the status of agriculture among its people...."<sup>22</sup> Or, as a speaker before the Agricultural Society expressed it, "The agriculturist was the first pioneer in the march of human progress." As a corollary, it was self-evident to Anglo-Americans that in Western Europe and the United States, "where agriculture is most extensively and intelligently pursued, we find the greatest refinement and wealth, and all the intellectual and political activities prevailing; the broadest liberty consistent with the rights of society is enjoyed, and there the strongest, most flourishing and enlightened governments

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<sup>21</sup> William McKaig, "Address Delivered before the Northern District Fair at its Eighth Annual Session, August 25, 1869," *CSAS Transactions 1868-69*, p. 313.

<sup>22</sup> J.R. Thomas, "History and Progress of Agriculture," *Pacific Rural Press*, 28 January 1871, p. 52. For another example, see the speech by Irving M. Scott before the State Agricultural Society in 1883 in which he argued that "the origin of agriculture precedes all historic record...[but] it is quite certain that it did not precede the dawn of civilization. For tilling the soil presupposes a security of rights, beyond the restraints imposed by absolute savage life: it was the offspring of necessity; for a man in savage life is not given to labor, nor to store up wealth in excess of his immediate wants." *CSAS Transactions 1883*, p. 136. George Fredrickson points out that "sedentary agriculture" had been one of the principal ways in which Europeans had differentiated themselves from "savage" peoples for centuries. George M. Fredrickson, *White Supremacy: A Comparative Study in American and South African History* (New York: Oxford University Press, 1981), 9-10.

exist.”<sup>23</sup> In this way, constructions of the landscape were linked quite directly with understandings of human beings and human society. The perfection of human culture went hand-in-hand with the perfection of the landscape, particularly in the nineteenth-century West where the processes of appropriation and settlement were still underway. Civilized human beings labored to produce certain types of landscapes. It was not simply a question of conquering nature, but of molding it into the appropriate forms. As one early immigrant to California, James Carson, wrote of the southern portion of the Central Valley:

As we look on this – the garden of California – the pride of an American heart makes our mind to people it with the hardy farmers of this country. We can imagine their neat cottages peeping out from amidst fields of flowing grain. We can see the neat village with its church spires, marking the march of civilization, and hear the lowing herds that browse on the luxuriant grass around.<sup>24</sup>

As Carson implies, the landscape itself not only promised economic wealth but augured cultural and even (white) racial success. There were those who argued that the sentimental attraction that Anglo-Americans felt towards certain landscapes were indicative of those landscapes' deeper value. "The admiration of mankind is ever directed,

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<sup>23</sup> B. Collins, "Opening Address Delivered September 8, 1881," *CSAS Transactions 1883-84*, p. 282.

<sup>24</sup> James H. Carson, *Life in California, Together with a Description of the Great Tulare Valley*, 2<sup>nd</sup> ed. (Stockton: The San Joaquin Republican: 1852), 51. This is what William Robbins refers to as "prescripting the landscape." See Robbins, *Landscapes of Promise*, 81.

in a healthy society, to the useful and the necessary," one Californian wrote, comparing his countrymen's preference for trees to their appreciation of "the lines of beauty" in women which were indicative of "reproductive power."<sup>25</sup> Another writer, remarking on the state's abundant wildflowers argued that their presence furnished "a truthful index to the adaptability of that land as a home for the human race."<sup>26</sup> Commenting on the healthfulness of the state, another observed that the environment offered an arena for perfecting the race:

All strangers observe the beautifully developed forms, the rounded limbs, swelling bust and rosy cheeks of California children; and with a climate so favorable to sound health and muscular development, if we shall properly train the moral and mental faculties, the men and women hereafter to grow up in California will furnish the first types of the Anglo-Saxon race.<sup>27</sup>

The environment itself – its aesthetic properties, material productiveness, and temperate climate – were signs of the civilization, progress, and white racial dominance that were to come. The natural beauty of the land was indicative of its fertility. The landscape

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<sup>25</sup> Abbot Kinney, "Our Forests. Their Destruction and Its Dangers," California State Board of Horticulture, *Third Biennial Report 1887-88* (Sacramento, 1888), 112.

<sup>26</sup> C.R. Orcutt, "Ornamental Wild Flowers and Shrubs Worthy of Cultivation," in California State Board of Horticulture, *Report 1890* (Sacramento, 1890), 126.

<sup>27</sup> J.B. Crockett, "Annual Address Delivered before the State Agricultural Society, September Twenty-first, Eighteen Hundred and Sixty-eight," *CSAS Transactions 1868-69*, p. 75.

foreshadowed and constructed its occupants even as they, in a much more literal sense, constructed it.

The relationship between environment and civilization was captured most succinctly in the notion of “finishing.” In more overtly religious contexts, finishing implied a shared belief in God and in the American mission to carry out His plans for the earth. Eden itself was the model under which farmers labored, for it was “the skill and labor of man that made Eden what it was.”<sup>28</sup> As the Reverend E.R. Dille described it before the State Agricultural Society:

The fact is, that the farmer is given the high honor of finishing and improving the Creator’s work. He made the sea, and the mountains, and the heavens as he would have them, complete at first. But the earth, with its animal and vegetable tribes, he only made in the rough and left man to put on the finishing.<sup>29</sup>

The title of this talk, given in the early 1880s, was “Man’s Sovereignty Over Nature,” which we might, not unreasonably, infer to be a discussion of the human “conquest” of the natural environment. But the title is somewhat misleading for the modern reader.

The talk does not assert human dominance over nature so much as it describes the mutual effects of nature and human beings on one another, and the ways in which human beings

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<sup>28</sup> E.R. Dille, “Address Delivered at Petaluma, September 7, 1881,” *CSAS Transactions 1881-82*, pp. 309-10.

<sup>29</sup> E.R. Dille, “Man’s Sovereignty Over Nature,” *CSAS Transactions 1883*, p. 281.

had begun to carry out nature's designs in California. In fact, this nineteenth-century author discusses at some length the effects of stock breeding and seed hybridization as examples of the way in which human beings had altered "natural" materials for the better.<sup>30</sup> In these ways and others, "Man" stamped his own image upon the works of God, creating a more perfect landscape by combining their own labor with nature. Farmers, for instance, looked at the cues which nature had provided when they assessed the landscape. In the Central Valley, observers saw wild oats and herds of elk, and concluded that nature had intended the landscape to support grain crops and stock.<sup>31</sup> As Dille described it:

The waving fields of wild oats were a prophecy of the abundant grain crops of to-day; and with the scattered trees along the lines of the water courses, [Nature] told us that with man's aid and patient labor the broad desolate plains might be decked with trees and dotted with pleasant homes.<sup>32</sup>

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<sup>30</sup> Dille, "Man's Sovereignty," 282. For elegant discussions of nature-culture hybrids in the twentieth century, see Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993); White, *The Organic Machine*; Donna J. Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," in *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 149-82.

<sup>31</sup> Although nineteenth-century settlers for the most part did not realize it, wild oats were not a species native to California but were introduced by the Spanish. [C.E. Grunksy], "Irrigation -- San Joaquin County," [1880s], pp. 28-29, box 6/68, State Engineering Department - William Hammond Hall Papers, Acc. 91-06-10, California State Archives, Sacramento; W. James Barry, *The Central Valley Prairie* (Sacramento: California Department of Parks and Recreation, 1972), 1:7.

<sup>32</sup> CSAS *Transactions 1880*, p. 18.

Through careful attention to the natural qualities of the landscape and the proper application of labor, culture would complete what nature had begun.<sup>33</sup> “Finishing” was a discourse about using human labor to mimic and further nature, a discourse that often blurred the line between nature and culture. The reworking of the environment on the part of human beings was ultimately part of a larger natural, or divine, whole.<sup>34</sup> As one writer asked rhetorically, “Nature or nature's God has done ninety-nine parts towards making the valleys one of the richest agricultural districts in the world; can men supply the small remaining fraction?”<sup>35</sup> Or as Dille concluded, “Labor has a higher end than to feed and clothe the body, or to add to its possessions, and that is to realize God’s ideals and to perfect our work and His.”<sup>36</sup> Agriculture signaled this improvement. Neatly

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<sup>33</sup> Dille, “Annual Address,” *CSAS Transactions 1881*, p. 311.

<sup>34</sup> Such a view was consistent with American agrarianism as it had been formulated by Thomas Jefferson in the late eighteenth and early nineteenth centuries. At the center of Jefferson’s world view had lain the Enlightenment concept of nature: the sense that the universe had a harmonious design and that human beings had an appointed role in a grander natural scheme. As Jefferson wrote to John Adams: “I hold...that when we take a view of the universe, in its parts general or particular, it is impossible for the human mind not to perceive and feel a conviction of design, consummate skill, and indefinite power in every atom of its composition. The movement of the heavenly bodies, so exactly held in their course by the balance of centrifugal and centripetal forces, the structure of our earth itself, with its distribution of lands, waters and atmosphere, animal and vegetable bodies, examined in all their minutest particles, insects mere atoms of life, yet as perfectly organised as man or mammoth, the mineral substances, their generation and uses, it is impossible, I say for the human mind not to believe that there is, in all this, design, cause and effect, up to an ultimate cause, a fabricator of all things from matter and motion, their preserver and regulator while permitted to exist in their present forms, and their regenerator into new and other forms.” Jefferson to John Adams, 11 April 1823, cited in Miller, *Jefferson and Nature*, 32.

<sup>35</sup> Cited in Mary Cone, *Two Years in California* (Chicago: S.C. Griggs and Co., 1876), 103.

<sup>36</sup> Dille’s language should not, however, obscure the fact that finishing was as much a secular as a religious discourse. Hall J. Kelley remarked with respect to the San Joaquin River: “This tranquil river must eventually become productive of vast benefit to California, not merely as a convenient and ready outlet for commercial purposes, but as a great outlet through which should be drained those superfluous waters....It is indeed a vast canal, constructed by an allmighty architect and destined I doubt not in future ages to

plowed fields and well-tended orchards represented not so much conquest and domination as a properly finished landscape.

Observers believed, moreover, that while any type of agriculture represented an improvement over mining, agriculture itself was undergoing an evolution toward higher forms. For instance, portrayals of Indian and Mexican culture in California typically focused on the primitive level of agricultural development. The stereotypical description of the state was one of a bounteous nature whose capacities had not been fully developed because of the indolence of the population. Anglos portrayed the land and its inhabitants as fundamentally mismatched. The land was capable of the highest forms of agriculture and civilization, but the people inhabiting it were not. As one commentator put it, the question for California immigrants was whether "a race of men can be developed here whose moral and intellectual worth will be commensurate with the products of this genial climate soil and sky."<sup>37</sup>

Such interpretations required, of course, that Anglos consistently ignore Indian manipulations of the landscape and that they denigrate agriculture as practiced during the Spanish and Mexican periods, and so they did. As one English traveler observed of Mexican California:

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transport countless products of mighty empire." Congress, House, "Mr. Kelley's Memoir," 25<sup>th</sup> Cong., 3<sup>rd</sup> Sess., 1839, House Report No. 101, App. O, 53.

<sup>37</sup> McKaig, "Address," 314.

Husbandry is still in a very backward state, and it is fortunate that the soil is so fertile, and that there are an abundance of labourers to perform the work, or I verily believe the people would be contented to live upon acorns. Their ploughs appear to have descended from the patriarchal ages, and it is only a pity that a little of the skill and industry then employed upon them should not have devolved upon the present generation.<sup>38</sup>

Similarly, speaking of her encounters with Mexican farmers, Eliza Farnham, a middle-class woman from the East who settled in Santa Cruz in 1850, wrote: "The out-door arts are little...advanced. Their plow consists of a forked branch of live-oak....to this the oxen are attached by a rude yoke, strapped upon their horns, and a man or boy walks or rides before them to keep them in place...."<sup>39</sup> The Surveyor-General's report of 1862 criticized "the shiftless Mexican system [of ranching] yet in vogue in the country, a system impossible with civilized customs."<sup>40</sup> By the turn of the century, once Anglo-American dominance was securely established, commentators "remembered" the previous landscapes that had been occupied by Mexicans and Native Americans as "God-forsaken

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<sup>38</sup> Frederick W. Beechey, *Narrative of a Voyage to the Pacific and Bering's Strait, to Co-operate with the Polar Expeditions*, vol. 2 (London: Henry Colburn and Richard Bentley, 1831), 38, cited in Quastler, "American Images of California Agriculture," 64-65.

<sup>39</sup> Eliza W. Farnham, *California In-doors and Out; or, How We Farm, Mine, and Live Generally in the Golden State* (New York: Dix, Edwards and Co., 1856), 184-85. See also Thomas J. Farnham, *Life Adventures and Travels in California* (New York: Cornish, Lamport & Co., 1851), 344. For one among many examples in which the Indian presence and alteration of the landscape is erased, see Franklin Langworthy, *Scenery of the Plains, Mountains, and Mines*, ed. Paul C. Phillips (Princeton: Princeton University Press, 1932), 152.

<sup>40</sup> California Surveyor-General, *Annual Report 1862* (Sacramento, 1862), p. 34.

localities" that Anglo-American agriculture had "transformed into sights of beauty."<sup>41</sup> Such disparaging observations on the part of Anglo-Americans were commonplace and served quite predictably to justify the usurpation of the landscape for their own purposes. Yet Anglo-Americans believed that they were not merely appropriating the land, but putting it to a higher and better use, and thus completing nature's plan. Appropriation was not only justified on the basis of cultural superiority, but naturalized as part of an evolutionary process. As the authors of a petition to Congress (asking for the endowment of an agricultural college in California) approvingly expressed the inevitability of the coming environmental and social change:

There is many a broad and fertile valley, that in coming years shall gladden us by fields of waving grain, and orchards of luscious fruits – many a bright hill side that soon shall be covered by the vine and fig tree – many a towering mountain, upon whose lofty summit now stand, in all their pride and glory, those giants of the forests, that ...must give place to that onward march of the Anglo-Saxon race...marking its progress onward along the Pacific, by civilization, cultivation, and Christianization....<sup>42</sup>

The linkage of cultivation, civilization, and race in this passage points to the some of the most fundamental cultural assumptions underlying western conquest and

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<sup>41</sup> J.W. Nelson, "The Fruit-Grower and His Work," in California State Board of Horticulture, *Twenty-Sixth Fruit-Growers' Convention* (Sacramento, 1902), 146-47.

<sup>42</sup> *California Farmer and Journal of Useful Sciences* 1 (5 January 1854). William Robbins also notes the use of evolutionary metaphors on the part of agricultural settlers in nineteenth-century Oregon. Robbins, *Landscapes of Promise*, 90-91, 115.

settlement. For white Americans of the late nineteenth century, the discourse of “civilization” was perhaps the pre-eminent cultural discourse. Taking as its referents first “savagery” and then “barbarism,” “civilization” referred to the highest stage of human development, as represented by the expansion and progress of Euro-American culture. In this rhetoric, civilization was understood as a set of social and cultural practices fortuitously associated with Northern European and Anglo-American culture. As Christians, these groups labored under their mission to bring civilization to those less fortunate than themselves. But as historian Gail Bederman has argued, the discourse of civilization was closely tied to, and imbricated within, prevailing ideas of race and gender.<sup>43</sup> The potential for civilization was ultimately proscribed by one’s racial category. Certain non-white racial groups, over time and under European or Euro-American tutelage, might gradually rise up the cultural ladder, but only those of European origin were capable of attaining the highest levels of civilization. Moreover, gender differentiation was taken as a key indicator of the level of civilization a given society had attained. Divisions of labor that did not adhere to Anglo-American norms -- or worse still, labor that was not divided clearly along gender lines -- were taken as incontrovertible evidence of backwardness. It was the release of middle-class white

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<sup>43</sup>Gail Bederman, *Manliness & Civilization: A Cultural History of Gender and Race in the United States, 1880-1917* (Chicago: University of Chicago Press, 1995), 25. Bederman quotes (pp. 137-38) the nineteenth-century psychologist G. Stanley Hall who put the issue as bluntly as anyone: “In the early history of mankind the women and men led lives more nearly alike and were consequently more alike physically and mentally than they have become subsequently in the lives of highly civilized peoples. The divergence of sex is a marked characteristic of progression among highly civilized races.” G. Stanley Hall,

women from productive labor and their confinement to the domestic sphere that most clearly demonstrated Euro-Americans' civilized superiority.<sup>44</sup>

But since civilization was also measured by the type and success of a given society's agriculture, in the western United States the discourse of civilization was closely linked with that of agrarianism. Discussions of (white) cultural "progress" in California and elsewhere linked gender, race, and landscape into an inextricable whole. Civilized landscapes were produced and occupied by civilized -- that is, white -- people. Race could be read from the landscape. In this way, the environment itself was marshaled into the project of constructing a white American identity. Agrarianism was about the finishing of nature on the one hand, and the creation of a racially exclusive landscape on the other. Ideas of landscape intertwined with dreams of racial homogeneity.

One place in which the association of agrarianism with whiteness emerged most clearly in California was in the critique that agrarians offered of the social effects of mining. As mentioned earlier, agrarians critiqued mining for the individualism and speculative capitalism that the latter had unleashed, as well as for what we might call its environmental unsustainability. While placing the blame for many of California's problems on the Gold Rush, these critiques inevitably invoked race. A recurring, and telling, criticism leveled at mining was that it had attracted a heterogeneous, and

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*Adolescence: Its Psychology and Its Relations to Physiology, Anthropology, Sociology, Sex, Crime, and Religion and Education* (New York: Appleton, 1904), vol. 2, 568-69.

<sup>44</sup> Glenda Riley, *Women and Indians on the Frontier, 1825-1915* (Albuquerque: University of New Mexico, 1984), 76-81.

distinctly less civilized, population to the state that threatened the potential of an agrarian future. Almost as soon as the Rush began, agrarian writers began to lament the racial turn that California's history had taken with the discovery of gold. An account of "gold fever" appearing in *Godey's Magazine* in March of 1849 was already eulogizing the lost opportunity to establish a white, agrarian society:

The fertility of the soil, the purity of the atmosphere and the evenness of the temperature justified their choice of home, and the prospect seemed to be that a rich and judicious cultivation would soon alter the whole face of the country, and that it would be populated by a race of Saxon land-holders. The gold discovery has wrought a sudden alteration.....<sup>45</sup>

As this writer suggests, the most disturbing aspect of the Gold Rush was *whom* it had brought to California. One California immigrant and propagandist, himself a forty-niner, referred with obvious chagrin to the "depravity of the mixed multitude who have congregated here from every clime." Another writer, reflecting on the impact of the Gold Rush from the perspective of California's racial problems in the 1880s, lamented that "the discovery of gold in California caused an influx of the most heterogeneous and incongruous mass of humanity ever collected with the confines of a single state."<sup>46</sup> Miners, in fact, had arrived in California from Mexico, South America, Europe,

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<sup>45</sup> H.T. Tuckerman, "The Gold Fever," *Godey's Magazine and Lady's Book* 38 (March 1849), 206; cited in Goodman, *Gold Seeking*, 137.

<sup>46</sup> Langworthy, *Scenery of the Plains, Mountains, and Mines*, 195; Blackwood, "The Development of the Country," 449.

Australia, and China, and the concern over whether California would be reserved for, or at least securely dominated by, a white population was central to anxieties over the results of the gold discovery. Racial heterogeneity, many felt, was retarding the development of civilization on the West Coast.

Such concerns suggest the precarious nature of the cultural project underway. At some level, agrarians understood that "white" skin was an ambiguous marker and did not guarantee civilization. In fact, the reverse was more likely true. The adoption of certain social and cultural forms associated with civilization -- small family farms, middle-class Anglo-American vales of self-restraint, heterosexual marriage, patriarchal families, and appropriately gendered divisions of labor -- were necessary to guarantee whiteness and an unproblematic American identity. Thus many in California saw threats to an agrarian society as a threat to the viability of the white race in this new environment. In the 1850s, middle-class observers were alarmed by many aspects of California society: criminality, the absence of family life, intemperance, and gambling, to name but a few. It was common knowledge that California had more than its share of "insane" individuals, which most attributed to the pace of life and to the disappointments and loneliness endured by many in the mines.<sup>47</sup> In fact, life in the mining camps potentially threatened white racial identity. In 1856 Eliza Farnham lamented that, "The respect one feels for the noblest race on earth, does not mitigate the pain of witnessing its degradation in the same

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<sup>47</sup> On mining as a cause of insanity, see Goodman, *Gold-Seeking*, 210-12; Farnham, *California In-doors and Out*, 367. On loneliness, see Rohrbough, *Days of Gold*, 81, 192-96, 236, 238.

fields where inferior peoples have fallen. One hopes, indeed, for the swift redemption of the noblest; but with the swiftest, it will, I fear, be the work of many years, to toil up to the elevation whence we have descended in a few."<sup>48</sup> From the perspective of Farnham, California's experience with mining presaged a degenerated white race and a debased regional culture.<sup>49</sup>

The fear of degeneration was connected not only with mining, but also with both the climate and landscape of California. Deprecating comments about the indolence of Mexicans and Native Americans were also expressions of anxiety about the environment's potential effects on middle- and working-class whites. Many California immigrants felt that they had witnessed first-hand the effects of degeneration when they had passed through Latin America on the way to California. As one argonaut wrote of Europeans in Brazil, "They have gained nothing of new life and vigor by being transplanted on to this virgin soil, but seem rather to have lost what little they possessed."<sup>50</sup> Speaking of the need to recruit more whites to agriculture, J. DeBarth Shorb argued that agriculture was the type of labor most likely to produce self-control. Shorb was clearly concerned about the potential for white degeneration in California. As

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<sup>48</sup> Farnham, *California In-doors and Out*, 306.

<sup>49</sup> For concerns over white racial degeneration, see Nancy Stepan, "Biological Degeneration: Races and Proper Places," in *Degeneration: The Dark Side of Progress*, ed. J. Edward Chamberlain and Sander L. Gilman (New York: Columbia University Press, 1985); Daniel Pick, *Faces of Degeneration: A European Disorder, c. 1848-1918* (Cambridge: Cambridge University Press, 1989); Bederman, *Manliness and Civilization*, 137-38.

he warned his audience, "When passion usurps control of our natures, we are as much the savage now as we ever were."<sup>51</sup>

In such an unfamiliar and potentially threatening environment, it was that much more critical that white people adopt appropriate behaviors and pursuits. Fundamental to preserving whiteness in California, as Shorb and others suggested, was the pursuit of proper agricultural labor. Such observations became more common in the mid to late 1860s, as the placers began to give out and profits from mining declined. Mining, many agreed, was not the natural inclination of white people. Writing in 1869, William H. Mills, editor of the *Sacramento Record-Union* claimed that "mining for precious metals was never heretofore the principal business of the Anglo-Saxon race, nor of any other race claiming a higher rank than semi-civilization."<sup>52</sup> Civilization and white identity were both predicated upon agricultural labor. Responding to the slow pace of agricultural development in California, Ezra Carr -- the newly appointed head of the University of California's agricultural station, a leader of the state Grange, and a transplant from Wisconsin, lamented the dissolution in California of the "natural" link between Anglo-Saxons and agriculture, which he attributed to mining and the attendant development of urban capitalism:

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<sup>50</sup> On argonauts' response to Latin America, see Brian Roberts, *American Alchemy: The California Gold Rush and Middle-Class Culture* (Chapel Hill: University of North Carolina Press, 2000), 119-29; quote is from p. 124.

<sup>51</sup> J. DeBarth Shorb, "Agriculture As It Is and What It Should Be," *CSAS Transactions 1882*, p. 24.

“For whatever reason the love of country life, which has been a characteristic of our blood and race, has so greatly lessened then, *it is greatly to be deplored*. While the laboring millions of England stand in an almost menacing attitude before her few hundred landholders, and are forced to emigration as their only resource, our own youth voluntarily turn away from the modest secure gains of steady industry to the uncertainties of city life and the excitements of speculation”<sup>53</sup> [emphasis in original].

As Carr himself inadvertently acknowledges, if the link between Anglo-Saxons and agriculture could be dissolved, it was anything but natural. Yet given that the linkage was cultural and constructed, it was then even more imperative that it be vigilantly maintained. If agriculture were indeed the basis of civilization, it was critical that white folks be the group most strongly associated with it, particularly in its more progressive and democratic forms.

This intersection of concerns over white identity and agrarian ideology was perhaps most forcefully evident in California’s preeminent social critic of the period, the journalist Henry George. Best known for his proposal for a single tax and for his

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<sup>52</sup> Caspar T. Hopkins, *Common Sense Applied to the Immigrant Question* (San Francisco, 1869), cited in Richard J. Orsi, “Selling the Golden State: A Study of Boosterism in Nineteenth-Century California,” (Ph.D. diss., University of Wisconsin, Madison, 1973), 60.

<sup>53</sup> Ezra S. Carr, “Address Delivered before the State Agricultural Society at the Annual Fair, September 18, 1870,” *CSAS Transactions 1870-71*, 95.

criticism of the effect of the railroad on California's social and economic development, George poured most of his intellectual energy into developing an economic theory that would explain the relationship between land and the wages paid to labor, eventually resulting in his most exhaustive work, *Progress and Poverty*. Although George is generally interpreted as urban in his outlook, with his ideals rooted in the small trades of the Jacksonian Northeast, his focus on the relationship between land labor produced an economic analysis that was agrarian in many of its essentials. George's was a pastoral vision, resting on "diffused proprietorship" and peopled with farmers, mechanics, artisans, and small tradesmen, all living and producing harmoniously within a network of local loyalties and natural limits. Implicit in this vision was racial homogeneity, something contemporaries surely understood. George himself was a vocal racist, who recapitulated the standard nineteenth-century arguments about the unassimilability of the Chinese: their negative effect on wages, their contribution to the furthering of monopoly, and ultimately their devastating effect on the development of American "civilization." In his testimony before the Senate Committee charged with considering the question of exclusion, George argued that the effect of "cheap" Chinese labor upon white workers was "precisely the same upon the white race as slavery."<sup>54</sup> But George's position was not simply economic and class-based; it was also explicitly racial. He believed that it was right, even necessary, to reserve the resources of the continent for the development of

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<sup>54</sup> *Report of the Joint Special Committee to Investigate Chinese Immigration*, 44<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1897, S.R. 689, p. 282.

Anglo-Saxon culture, a position he would hold throughout his life. As he wrote to a friend, "Is there no such thing as family, nation, race?"<sup>55</sup> Implicit in agrarian constructions of the landscape that George offered then was the assumption that agricultural progress and racial homogeneity reinforced one another. As he remarked of the large stock ranches, "[The] land is covered with scraggy cattle, which need to look after them only a few half-civilized vaqueros."<sup>56</sup>

In California, agrarian critics attacked not only mining and cattle ranching, however; they more pointedly attacked the large-scale wheat farming that had developed in the late 1850s and 60s. It was against wheat farms, with their excessive acreages and large itinerant labor force, that Henry George had directed his criticisms. Writing of wheat culture, George derided the "ill-kept, shadeless dusty roads, where a house is an unwonted landmark, and which run frequently for miles through the same man's land, plod the tramps, with blankets on back...looking for work, in its seasons, or toiling back to the city when the ploughing is ended or the wheat crop is gathered."<sup>57</sup> The principal criticism of wheat farming was that it had encouraged speculation and the acquisition of large tracts of land. For many Californians, including George, wheat farming was

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<sup>55</sup> John L. Thomas, *Alternative America: Henry George, Edward Bellamy, Henry Demarest Lloyd and the Adversary Tradition* (Cambridge, MA: Harvard University Press, 1983), 50, 62-63, quote from page 63. For a discussion of George which acknowledges the centrality of racism to his larger program, see Alexander Saxton, *The Indispensable Enemy: Labor and the Anti-Chinese Movement in California* (Berkeley: University of California Press, 1971), 92-104. Ian Tyrell has also insightfully pointed to the environmental dimensions of George's critique in *True Gardens of the Gods*, 38-39, 48-49.

<sup>56</sup> Henry George, *Our Land and Land Policy: Speeches, Lectures, and Miscellaneous Writings* (1871; reprint, East Lansing: Michigan State University Press, 1999), 47.

synonymous with “land monopoly.” As one speaker before the Agricultural Society noted derogatorily, “Large farming is not farming at all. It is mining for wheat.”<sup>58</sup> Such criticisms were tied to concerns over speculation as well as to market and environmental factors, which had caused extremely large variations in both harvest and prices.<sup>59</sup> Yet more importantly, such criticisms reveal that contemporaries evaluated agriculture in cultural, as well as economic terms, and most considered wheat growing to be a “crude” form of farming. Wheat farming required large amounts of migratory, and culturally undesirable, labor.<sup>60</sup> It was thus associated with the *absence* of white women, heterosexual families, and children -- the principal markers of civilization. Many who criticized wheat farming voiced the concern that California’s white settlers were failing to live up to the potential of the landscape, much as their Mexican, Spanish, and Indian predecessors had. As the Sacramento *Daily Union* lamented in 1877:

We are all but too familiar with the picture: A level plain, stretching out to the horizon all around; for a few months a wavering sea of grain, the unsightly stubble; in the center a wretched shieling [hut] of clapboards, weather-stained, parched, and gaping; no trees, no orchard, no garden, no signs of home....On everything alike the tokens of shiftlessness and

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<sup>57</sup> *Ibid.*

<sup>58</sup> CSAS, *Transactions 1880*, 231.

<sup>59</sup> Donald J. Pisani, *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1850-1931* (Berkeley: University of California Press, 1984), 9-11.

<sup>60</sup> Richard Steven Street, "Tattered Shirts and Ragged Pants: Accommodation, Protest, and the Coarse Culture of California Wheat Harvesters and Threshers, 1866-1900," *Pacific Historical Review* 67 (November 1998), 573-608.

barbarism....We see nothing in the prospect but a shiftless drifting backward further and further into barbarism, until the fertility of the soil being exhausted, the reckless and half-civilized tillers of it shall be compelled to migrate.<sup>61</sup>

For many contemporaries, fields of wheat did not signify civilization but its opposite.

It was nineteenth-century fruit growers who most thoroughly developed the association of particular landscapes with both race and culture. As Ian Tyrell has shown, in the late 1860s and 1870s the rise of fruit-growing in California led the exponents of horticulture to claim that theirs was not merely a potentially profitable change but an evolutionary advance. While acknowledging that wheat had been a necessary step in California's agricultural development, they argued that it was only less-developed societies that were incapable of moving on to raise other, more advanced crops.<sup>62</sup> In this genealogy, the primitive agriculture and stock raising of the Spanish missions and Mexican ranchos had first given way to wheat farming, which in turn was being replaced by the growing of fruits and other specialty crops. Reiterating the link between landscape and civilization, promoters of horticulture argued that the diversity of agricultural crops was evidence of a higher state of society.<sup>63</sup> They contrasted the culture of fruit-growing with that produced by grain farming. Nineteenth-century wheat farming was infamous for its violent and dangerous work culture. Although in the 1850s and early 1860s most

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<sup>61</sup> *Sacramento Daily Union*, 24 May 1877, cited in Pisani, *From the Family Farm to Agribusiness*, 10.

<sup>62</sup> California State Board of Horticulture, *Annual Report 1883*, 31.

of these "bindlestiffs" were of European origin (as well as Native American, Mexican, and some African-Americans), their "whiteness" was open to question. In the contemporary diatribes against the undesirable laborers employed by wheat farmers, few defended the European-American bindlestiffs, and employers often contrasted them negatively with the white laborers employed on Eastern farms. In fact, the bindlestiffs also raised the worrisome potential for white degeneration. As the *Pacific Rural Press* noted of the bindlestiffs, "It is lamentable to observe how large a proportion of our farm laborers have thus become degraded."<sup>64</sup>

Amidst such concern over cultural stagnation and white degeneration, advocates of horticulture argued that agricultural diversity served as an index of cultural advancement. As one advocate of apricot trees noted, these and other fruit trees had "followed the march of men and civilization" through Europe and now to California.<sup>65</sup> The most positive aspect of fruit growing, they argued, was that it would necessitate the division of large landholdings into smaller parcels, which would, in turn, further the creation of an agrarian society of small, independent farmers. Promoters of horticulture also argued that the high market price of fruits promised a better living for the small

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<sup>63</sup> Tyrell, *True Gardens of the Gods*, 36-55.

<sup>64</sup> Quote is from article reprinted in the *Napa Reporter*, 9 November 1872, quoted in Street, "Tattered Shirts and Ragged Pants," 598. Estimates of the ethnic composition of wheat laborers in the period 1860 to 1900 suggest that 40% were native-born whites and another 40% were northern European. Street, "Tattered Shirts and Ragged Pants," 580.

<sup>65</sup> Edwin Kimball, "The Apricot," California State Board of Horticulture, *Third Biennial Report 1887-88* (Sacramento, 1888), 129.

farmer than grains.<sup>66</sup> As the president of the State Board of Horticulture argued in 1885, “The tendency of your efforts is toward a higher civilization; it means the increase of independent land owners, the encouragement of those things which civilize, which do good, which destroy crime, or rather obliterate its causes.”<sup>67</sup>

The primary marker of this cultural advancement was the presence of white women and heterosexual families, the social form widely acknowledged to be missing in mid-nineteenth century California. Racialized nationalism relied upon women and their bodies, as well as the well-cultivated landscape to symbolize civilization.<sup>68</sup> Here again fruit growers argued that their own culture was superior to that of both mining and wheat. It had been the absence of white women, most agreed, that had been responsible for the social chaos of the mining period.<sup>69</sup> Wheat farming only reproduced this troublesome

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<sup>66</sup> Benjamin C. Truman, *Home and Happiness in the Golden State of California* (San Francisco: Central Pacific Railroad Co., 1883), 43. Also [C.E. Grunsky], "Irrigation - San Joaquin County," ([1880s]), p. 24, box 6/68, State Engineer's Department—William Hammond Hall Papers, Acc. 91-06-10, California State Archives. The publications of the state horticultural society consistently reiterated this theme. For instance, "Because you require so much more of care, of industry, of patience, and of prudence in your business, that you must inevitably raise a better class of citizens; and, moreover, the fact that your industry requires so much individual attention, lessens the quantity of land you are capable of holding and cultivating, and so tends to the cutting up of that portion of the State which is fit for your purposes into smaller holdings, which is the salvation, the prosperity, and the safety of the State." California State Board of Horticulture, *Annual Report 1883* (Sacramento, 1883), 31.

<sup>67</sup> California State Board of Horticulture, *Biennial Report 1885-86* (Sacramento, 1886), 48-49.

<sup>68</sup> For an analysis of the role of women and women's bodies in symbolizing racialized nationalism in a different context, see Inderpal Grewal, *Home and Harem: Nation, Gender, Empire, and the Cultures of Travel* (Durham, NC: Duke University Press, 1996), 43.

<sup>69</sup> Susan Lee Johnson has demonstrated the cultural significance of the absence of middle-class white women and the pervasiveness of middle-class gender ideology in her history of the Gold Rush. Her superb analysis of the mining era makes the gendered dimensions of agrarian rhetoric in the subsequent decades much more comprehensible. Susan Lee Johnson, *Roaring Camp: The Social World of the California Gold Rush* (New York: Norton, 2000), esp. 99-183. This is also a primary theme of Roberts, *American Alchemy*.

situation, as it involved large farms that employed large itinerant labor forces.

Horticulturists, in contrast, emphasized the family nature of their enterprise and its consistency with domestic ideology. Fruit growing was an occupation in which "all the members of the family can take part" and through which "love of home is engendered."<sup>70</sup>

Women were regularly featured speakers at the annual convention, typically monopolizing one day out of four. In their speeches, they adopted the familiar female reformist rhetoric of the period, imbuing it with an environmental and agricultural component. They argued, for instance, that the richest rewards of fruit growing were not economic but the "harvest of morality, beauty, and religion."<sup>71</sup> Moreover, both men and women associated their work with none other than the Garden of Eden; as Edwin Kimball put it to his fellow fruit-growers, theirs was "the first calling of the parents of our race."<sup>72</sup> "As communities grow in wealth, population and intelligence," one horticultural newspaper explained, "grain growing gives way to the fruit tree and vine."<sup>73</sup>

Fruit trees also symbolized permanency, or at least a desire for permanency, that grain crops could not. They seemingly mirrored and reinforced domestic ideology in its

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<sup>70</sup> N.P. Chipman, "Annual Address Delivered before the State Agricultural Society at Sacramento, California, September 16, 1886," *CSAS Transactions 1886*, p. 194.

<sup>71</sup> Flora Kimball, "Annual Address," California State Board of Horticulture, *Biennial Report 1889*, p. 331. Tyrell also mentions the role of women in the State Horticultural Society. Tyrell, *True Gardens of the Gods*, 46.

<sup>72</sup> California State Board of Horticulture, *Biennial Report 1884*, p. 51.

<sup>73</sup> *California Fruit Grower*, 17 August 1889, cited in Vaught, *Cultivating California*, 47.

assertion of stasis and dwelling in opposition to change and traveling.<sup>74</sup> Domestic ideology emphasized stasis in response to the continual dynamics of capitalist society. Middle-class Americans perceived the home as a haven and bulwark against the unpredictability and vicissitudes of the market. Yet in western North America, amidst American colonization and conquest, the assertion of domesticity and settlement was even more radical, particularly on the part of those who had just traveled across the entire North American continent, often in search of quick fortunes. Horticulture advocates focused on their creation of a culture that came from staying put, from sinking roots in both the literal and metaphorical sense.<sup>75</sup>

Over the course of the decade several individuals optimistically expressed their belief that wheat farming was dying out and that a more civilized, progressive, and racially appropriate horticulture was taking its place. The engineer Carl Grunsky, for instance, wrote in his field notes that the opinions of held by San Joaquin County wheat growers should be ignored because wheat was “sure to give way to other products,” as California’s development continued.<sup>76</sup> Charles Nordhoff, perhaps California’s most well known promoter, had referred to agriculture during the wheat period as “sloppy and

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<sup>74</sup> On traveling, dwelling, and culture, see James Clifford *Routes: Travel and Translation in the Late Twentieth Century* (Cambridge, MA: Harvard University Press, 1997), 1-46.

<sup>75</sup> For criticisms of the "nomadism" associated with the argonauts, see. A.A. Sargent, “Annual Address Delivered before the State Agricultural Society, September 16, 1870,” *CSAS Transactions 1870-71*, p. 84; Dille, “Annual Address,” 312.

<sup>76</sup>[Grunsky], “Irrigation -- San Joaquin County.” For defensive posture of wheat farmers, see the speech by H.M. Larue, who was himself a large landowner and wheat farmer, in *CSAS Transactions 1880*, p. 11.

slipshod." But writing of the region ten years later, Nordhoff had changed his assessment:

A vast change has come about; and agriculture has formally taken possession of the valley. It is a spectacle of brains applied to farming in the best manner and, at the same time, in ways so novel as cannot but delight the observer. [Horticulture and irrigation are] turning the Sacramento and San Joaquin valleys into a vast garden.<sup>77</sup>

E.J. Wickson, the editor of the *Pacific Rural Press*, argued that citrus farming in particular would draw into California "the class of people which constitute the most desirable element in the upbuilding of a great state."<sup>78</sup> Elsewhere Wickson confidently proclaimed that, "The action is horticulture; the reaction is homoculture."<sup>79</sup> The planting of orchards would inevitably bring the cultural and racial homogenization that agrarians such as Wickson so ardently desired.

Nineteenth-century commentators such as Nordhoff and Wickson did not see space as a theoretical construct, or the "nature" of the Central Valley as their own ideological production. Nonetheless, they clearly linked the creation of certain types of

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<sup>77</sup> Charles Nordhoff, *California for Health, Pleasure, and Residence* (San Francisco, 1872), 187, and *California for Health, Pleasure, and Residence*, 2nd ed. (San Francisco, 1882), 97-98. Nordhoff wrote these tracts while on commission for the Southern Pacific Railroad. See also N.P. Chipman, "Wheat vs. Fruit," California State Board of Horticulture, *Report 1889* (Sacramento, 1890), 305-18.

<sup>78</sup> E.J. Wickson, *The Orange in Northern and Central California* (Sacramento: California State Board of Trade, 1903), 5.

<sup>79</sup> *Pacific Rural Press*, 15 July 1899, cited in Vaught, *Cultivating California*, 14.

spaces with specific cultural and social values, and with specific types of laboring bodies. And, moreover, they believed that space shaped those who occupied it. References to "natural wealth" were an attempt to set the stage for a certain type of occupation and use of the land, and to offer assurance that the landscape itself would help to foster a particular kind of culture. This imagery helped to create a collective white identity and to counter the rootlessness that many transcontinental migrants must have felt. It also helped to bolster white racial identity amidst an ethnically diverse population. First came nature, then (Anglo-American) culture. Through its receptiveness to Anglo-American agriculture, nature, they argued, sanctioned and legitimated their use of the land. The planting of orange trees and grape vines was a contribution toward the forging of white American identity in the Western United States. In their eyes, the expansion of Anglo-American settlement would not merely utilize, but could ultimately improve, the natural and social environment of the North American continent.

As discussions of the environment were also implicitly discussions of human beings and human society, so were discussions of human beings often discussions of the environment. The material reworking of the environment into an agrarian landscape required immense amounts of labor, and no subject was more discussed in regional agricultural forums and publications. Discussions of labor provided another point through which nineteenth-century farmers and agricultural commentators expressed the implicit connections between the landscape and the human beings that occupied it.

The preeminent concern throughout the late nineteenth century was California's, and particularly the Central Valley's, small population. The hoped-for environmental transformation, everyone realized, required human bodies to provide their labor. Human labor needed to be mixed with nature in order to harness natural wealth. As one speaker before the Agricultural Society noted:

There is no principle in political economy more thoroughly established or more generally acknowledged than that a state cannot come up to its natural standard of prosperity without sufficient labor to develop and husband its resources.<sup>80</sup>

From 1850 on, concerns over the valley's relatively small number of inhabitants surfaced repeatedly. Yet after the Gold Rush, California's relatively slow rate of population growth compared to other western states, particularly in the inland valleys, was a cause of considerable concern among regional boosters. This clamor for (European and Euro-American) immigration increased markedly over the course of the sixties and seventies as California boosterism emerged in full force. Even during the 1880s, the time of the state's supposed "boom," California's rate of growth was equaled or exceeded by every state or territory west of the Missouri, except New Mexico and Nevada.<sup>81</sup> According to the *Sacramento Bee*, in 1869 California was "absolutely famishing for want of

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<sup>80</sup> CSAS *Transactions 1866-67*, p. 7.

<sup>81</sup> Orsi, "Selling the Golden State," 11. For an example of the concern over immigration in this period, see as well Chipman, "Annual Address ...1886," pp. 187-207.

people....Her hills are idle, her valleys untilled, her streams unused....She is behind the times in all material progress.”<sup>82</sup> In an address before the Agricultural Society the following year, Senator A.A. Sargent lamented that, “Bleak Minnesota outstrips us day by day. Iowa has five times our population.” Rhetorically he asked his audience, “Why are we not sharing more largely in the fertilizing tides of European immigration?”<sup>83</sup> By the late 1860s, publications of the state’s agricultural and horticultural societies repeatedly emphasized the need to attract more immigrants to the state, and the State Board of Agriculture was making regular appeals to the Legislature to adopt measures to encourage immigration.<sup>84</sup> Reacting to such pleas, in 1871 the governor of California declared in his annual message to the legislature that “the importance of inviting and facilitating the immigration of a farming population from the Eastern States and Europe has been felt by all intelligent men in California.”<sup>85</sup>

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<sup>82</sup> Orsi, “Selling the Golden State,” 59.

<sup>83</sup> Sargent, “Annual Address,” 82. Also J. Ross Browne, “Reclamation and Irrigation,” *CSAS Transactions 1872*, p. 421.

<sup>84</sup> *CSAS Transactions 1868-9*, p. 6.

<sup>85</sup> J. Ross Browne, “Reclamation and Irrigation,” 392. For the most part, organized immigration efforts originated in California’s cities – San Francisco and Los Angeles – and were spearheaded by the commercial and business elite who recognized that economic prosperity depended upon a prosperous agricultural hinterland. But the emphasis on immigration was part of a broader nineteenth-century belief that population growth necessarily fueled not only economic prosperity but also cultural advancement. Boosters looked to agricultural settlers to bring both their labor and their moral influence. With respect to the cultural advantages of immigration, Norton Chipman told his audience, “People build for themselves better homes, surround themselves with more civilizing influences, have greater social advantages and means of education in direct proportion to the density or sparseness of population.” Chipman, “Annual Address,” 188. See also *Pacific Rural Press*, 6 October 1883, p. 27; Orsi, “Selling the Golden State,” 52-53.

The call for "European" immigration was, of course, one response to the ethnically and racially mixed population of California in the 1870s. As several scholars have pointed out, the irony of the move towards horticulture was that it, like wheat, required immense numbers of temporary workers, contrary to the initial assertions of its agrarian supporters that it could be sustained through family labor and the hiring of perhaps a few wage workers.<sup>86</sup> Moreover, by the 1870s Chinese men supplied much (though not all) of that labor in the Central Valley, threatening the agrarian vision of neat orchards tended solely by whites.<sup>87</sup> Thus, calls for increased immigration and the development of the state's agricultural resources were also implicitly -- and sometimes explicitly -- calls for racial homogenization. As A.A. Sargent argued before the State Agricultural Society:

I am not able to concur in the opinion that the immigration in large numbers of this people is desirable. A slower growth of community, with the elements in it only of Christian civilization, seems to me far preferable to rapid development by an alien, heathen population. Would not twenty-five stalwart German or Scandinavian emigrants, with their families, be

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<sup>86</sup> In the 1920s, the agricultural economist Frank Adams estimated that a family of four could manage only ten acres of apricots without additional help, but other analysts suggested that even a farm of this size would require additional outside labor. See Steven Stoll, *The Fruits of Natural Advantage: The Making of the Industrial Countryside in California* (Berkeley: University of California Press, 1998), 130-32.

<sup>87</sup> While it is not possible to know precisely what percent of the farm labor force Chinese workers constituted, historian Sucheng Chan has utilized census data to estimate that in 1880, Chinese laborers may have made up three-quarters or more of the work force in Sacramento and Yuba counties, and perhaps 45% of the work force in other agricultural regions. Anecdotal reports from the period suggest that Chinese workers made up as much as seven-eighths of the labor force in areas of the Sacramento Valley, but Chan is skeptical about such high estimates. Sucheng Chan, *This Bittersweet Soil: The Chinese in California Agriculture, 1860-1910* (Berkeley: University of California Press, 1986), 304-18.

better for the real interests of the State than the whole Chinese population of I street?<sup>88</sup>

Yet commitments to racial homogeneity in the valley were threatened by the imperatives of capitalism.<sup>89</sup> As the massive labor requirements of fruit-growing became obvious and anti-Chinese racism reached its peak, marked by the passage of the Chinese Exclusion Act in 1882, California horticulturists bemoaned their own situation. While

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<sup>88</sup> Sargent, "Annual Address," 87. The depth of Sargent's racism is evident in his work as the head of the Senate Committee that investigated the Chinese presence in California and recommended exclusion. See "Report of the Joint Special Committee to Investigate Chinese Immigration," iii-viii.

<sup>89</sup> In his pathbreaking study of California farmworkers, *Bitter Harvest: A History of California Farmworkers, 1870-1941* (Ithaca: Cornell University Press, 1981), Cletus E. Daniel has argued that while nineteenth-century agrarians such as Sargent utilized racist appeals, this represented expediency rather than a commitment to racism on their part. As Daniel puts it, "Their essential objection was not to the Chinese themselves but to those developments and circumstances that threatened to make a large, dependent wage-labor force a permanent feature of agricultural life in California" (30). The development of a racialized agriculture labor force is a well-worn topic in California historiography, but the literature is almost uniform in placing the blame for this development on "capitalist" landowners and in exempting "agrarians" from any significant role. This has worked to retain agrarianism as a pure, though unrealized, alternative to more capitalist forms of agriculture, particularly corporate agriculture as it developed in the Central Valley. The classic example is, of course, Carey McWilliams, *Factories in the Field: the Story of Migratory Farm Labor in California* (Boston: Little, Brown and Co., 1939). See also Tomas Almaguer, *Racial Fault Lines: The Historical Origins of White Supremacy in California* (Berkeley: University of California Press, 1994), 169; Linda C. and Theo J. Majka, *Farm Workers, Agribusiness, and the State* (Philadelphia: Temple University Press, 1982). Steven Stoll offers a different opinion, arguing that agrarians, at least as represented by California's fruit growers, never actually believed in agrarianism at all. Nonetheless, Stoll still assumes that the ideology of agrarianism as fundamentally not racial or racist. See Stoll, *The Fruits of Natural Advantage*, especially 134. A notable exception to this generalization, is an older study on Chinese labor by Ping Chiu who speculated that some small farmers began to join urban workers in the anti-Chinese movements in the nineteenth century for various possible reasons. Ping Chiu, *Chinese Labor in California, 1850-1880: An Economic Study* (Madison: The State Historical Society of Wisconsin, 1963), 87. And, more recently, Ian Tyrell has suggested the cultural link between race and agrarian rhetoric in *True Gardens of the Gods*, 39, 46-47. In a revealing historical article that perhaps set the tone for subsequent treatments of agrarianism, Paul Taylor interpreted the anti-Chinese movement in nineteenth-century California with considerable sympathy because he saw it as an effort on the part of Californians to establish a more "egalitarian" society. Of course, this "egalitarianism" was racially exclusive. Taylor's silence on the relationship between agrarianism and what subsequent scholars have labeled "herrenvolk" democracy, and the implicit racism of his position, has been noted only by Sucheng Chan, *This Bittersweet Soil*, 284-88. See Taylor, "Foundations of California Rural Society," *California Historical Society Quarterly* 24 (1945), 193-228.

they shared a racialized agrarian vision, they also relied upon Chinese labor to turn a profit and occasionally even acknowledged the benefits of employing Chinese men -- not the least of which was their skill in the orchards. Landlords who depended upon Chinese tenants or laborers often indicated a willingness to moderate their racial views.<sup>90</sup> The desire for profits muted calls for a homogenous white society on the part of some, though many continued to call for efforts to attract white workers, and some even suggested reducing crop acreages to forestall the use of Chinese labor.<sup>91</sup>

The problem posed by the presence of the Chinese was precisely that they disrupted the mutual relationship between the environment and those who occupied it. In agrarian thinking, the improvement of the land had a critical subjective corollary. Labor linked landscape and bodies in that it transformed them both. Changes in external nature mirrored changes in an internal nature. Implicit in the agrarian transformation of the landscape into aesthetically pleasing farms was the transformation of the laborer into a moral, healthy, and virtuous person. Human labor was ultimately a tool for finishing both nature *and* men. In this thinking, agricultural labor was much more than a simple commodity. But the benefits of agricultural labor were restricted to certain types of individuals. While an agrarian landscape might contribute to the shaping of the human

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<sup>90</sup> On attitudes towards Chinese farm laborers, see California Bureau of Labor Statistics, *Biennial Report 1883-84* (Sacramento, 1884), 61, 65-66. Also Stoll, *Fruits of Natural Advantage*, 133-37; Vaught, *Cultivating California*; 72-76, 85-89.

<sup>91</sup> "Report on Horticulture, Santa Barbara County, by President Ellwood Cooper, December 17, 1884," California State Board of Horticulture, *Biennial Report 1884* (Sacramento, 1884), 50. For need to reduce crop acreages, see *Pacific Rural Press*, 8 September 1883, p. 192. For efforts to recruit white women and boys to field work, see *Pacific Rural Press*, 13 October 1883, p. 306.

beings that lived there, this shaping depended on a body's own inherent characteristics. In other words, the link between agriculture and civilization always hinged on the individual bodies in question.<sup>92</sup>

First of all, race determined the social experience of agricultural labor: the places in which a person could labor, the type of work that one did, and the amount that one was paid. And differences in the *ability* to labor were likewise consistently ascribed to race. The Chinese, for instance, were recognized for their ability to tend orchards and to pick and pack fruit, a job that required considerable skill and patience.<sup>93</sup> Similarly, Chinese men performed most of the work of leveeing the Delta. The task fell to the Chinese because it was recognized as particularly arduous and dirty labor. As a local newspaper put it, the Chinese "will work in water without a murmur, and dig [their] way through the mud and slime where a white man couldn't be induced to enter for either love or money."<sup>94</sup> Moving through the peat was particularly difficult; it was so boggy and mucky that horses would become hopelessly mired and have to be killed. While Chinese dug and built the earthen levees, it was typically white labor that was used to construct bulkheads and culverts. The expertise of the Chinese in levee construction was widely

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<sup>92</sup> As Edwin Kimball argued before the State Horticultural Society: "When the last Chinaman...shall rest from his labors here, or pass over to the Celestial Kingdom, send with him all the swine, from which his manhood and religion springs, and with it the whole foul product...that curse the race, then our orchards shall smile under the hands of intelligent labor and from our olive presses the oil of strength and gladness shall dwell in the land forever." California State Board of Horticulture, *Biennial Report 1884*, p. 55.

<sup>93</sup> Vaught, *Cultivating California*, 71; Chan, *This Bittersweet Soil*, 243-48.

recognized. Among other things, they were credited with the development of the "tule" shoe for horses.<sup>95</sup> Nonetheless, Chinese were consistently paid less for their work than white men, and, moreover, employers and observers often commented upon the supposed inadequacy of their work. As the engineer C.E. Tucker reported regarding the levee on Boudin Island built in 1871, "Very little attention was paid to the location of the levee, it being mostly left to the Chinamen, as a natural consequence, it was very crooked...."<sup>96</sup> Here Tucker reiterated the belief that particular landscapes were associated with particular kinds of human beings -- orchards with a progressive and advanced culture, and, in this case, crooked levees with Chinese laborers.

Moreover, race determined the *effects* of labor upon individuals. The subjective benefits of agricultural labor were presumed to be unavailable to the Chinese. On the one hand, agrarians had long maintained that only certain kinds of people would undertake the labor necessary to improve the landscape -- that is, African-Americans, Mexicans, and Native Americans were too indolent or ignorant to carry out the work. But the agricultural work of the Chinese in this period was, by all accounts, too significant to be ignored. Yet agrarians and others insisted that Chinese men did not and could not benefit from agricultural labor in the same way that white men necessarily did. As the president

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<sup>94</sup> *Antioch (California) Ledger*, 13 November 1875, p. 3, cited in John Thompson, *Discovering and Rediscovering the Fragility of Levees in the Sacramento-San Joaquin Delta, 1870-1879 and Today* ([Sacramento]: California Department of Water Resources, 1982), 7.

<sup>95</sup> Chan, *This Bittersweet Soil*, 177.

<sup>96</sup> C.E. Tucker, "Field Notes," 1878, book 89, box 23, State Engineering Department -- William Hammond Hall Papers, Acc. 91-07-04, CSA.

of the state agricultural society put it, the agricultural work of the Chinese was “merely a contribution to physical brute labor,” which “could not augment the aggregate of patriotism, of intelligence, of sociability, of morality, or of any other attribute of a high civilization.”<sup>97</sup> For agrarians, non-white labor -- agricultural or otherwise -- was inimical to the development of their envisioned society.

For white men, in contrast, agricultural labor contributed not only to their racial and national identity but also to their identity as men. Agriculture, many insisted, produced true men in contrast to other potentially feminizing occupations. As one speaker before the Agricultural Society put it, “We know full well that the farming class is sturdy, manly, vigorous of thought, persistent in action.”<sup>98</sup> Or, as another speaker claimed, “[Labor’s] loftiest aim is to develop the manhood of the laborer. It should not only produce thoroughbred trotters, and sleek Devons, and prize cabbages and pumpkins, and pears, but *men*...,” and, moreover, it was specifically agricultural labor that produced “the most sterling qualities of manhood.”<sup>99</sup> “The farmer,” another argued, would be “the conservator of noble manhood” in California.<sup>100</sup> Most obviously, agriculture fostered and rewarded the manly virtue of hard work. Again, the contrast was at first with mining, in

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<sup>97</sup> H.M. Larue, “Opening Address, September 12, 1862,” *CSAS Transactions 1882*, p. 19.

<sup>98</sup> “Opening Address of President Finigan, September 11, 1883,” *CSAS Transactions 1883*, p. 126.

<sup>99</sup> Dille, “Annual Address,” 311; *Pacific Rural Press*, 24 June 1871, p. 391.

<sup>100</sup> “Opening Address of President Finigan,” 130.

which the pecuniary rewards were seen as random and unpredictable.<sup>101</sup> Mining had directly challenged the cultural assumption that failure was indicative of poor character, which was one of the principal reasons it drew such scathing attacks. Yet agrarians also drew a distinction between farming and urban forms of labor in this regard. They asserted that agriculture was more predictable, less risky. As one commentator explained to his agricultural audience, in "mercantile ventures" not more than three percent of men were successful, while ninety-seven percent went "down in sorrow, and oftentimes disgrace...." In contrast, he assured his listeners that among farmers only five percent failed to make a successful living for themselves.<sup>102</sup>

Agrarians also emphasized the positive effects of farming on the physical body, something presumably not available from urban middle-class professions. As several scholars have noted in other contexts, the emerging focus on the material body in the late nineteenth century brought renewed attention to the physiological basis of gender difference. Most obviously, Victorian "manhood" -- the complex of moral qualities associated with those who thought of themselves as more "civilized" males -- was being supplemented by a notion of "masculinity" that was increasingly defined in terms of bodily shape and physical strength. By the late nineteenth century, middle-class men were paying assiduous attention to the male body, and, at the same time, physical

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<sup>101</sup> Rohrbough, *Days of Gold*, 192-96; Johnson, *Roaring Camp*, 152. On the significance of failure, see E. Anthony Rotundo, *American Manhood: Transformations in Masculinity from the Revolution to the Modern Era* (New York: Basic Books, 1993), 174-85.

<sup>102</sup> CSAS *Transactions 1872*, p. 77.

strength and strength of character were increasingly conflated.<sup>103</sup> California agrarians likewise associated manhood and physical robustness, and used this to argue for the superiority of farming as a way of life, especially in contrast to the employments available in urban areas. Reverend William McKaig, for instance, told his listeners at the Agricultural Society meeting of 1868 that farming furnished "good health and a bountiful supply of physical vigor," and pointed out that farmers had the longest life expectancy of any occupation. He specifically contrasted the manhood of the farmer to the implied femininity of those who lived "solely for material gain." Or, as another speaker claimed, "we cannot too highly value bodily energy, a robust constitution, good digestion, steady nerves, and strong, tough sinews."<sup>104</sup>

Proponents of horticulture argued that their own particular type of agricultural work produced the most desired masculine characteristics. They argued that it was not simply agriculture that produced "manhood," but it was the specific mental and physical activities associated with orchard work --transplanting, pruning, picking -- that produced the desired non-corporeal qualities. Believed to require more intelligence and care, horticulture was assumed both to demand and create a better type of farmer. Fruit growers discussed the particulars of fruit culture incessantly in their publications, suggesting the sincerity of their claims. "Successful horticulture," one orchardist wrote,

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<sup>103</sup> Bederman, *Manliness and Civilization*, 41-42; Rotundo, *American Manhood*, 222-27.

<sup>104</sup> Dille, "Address," 311.

"requires the quick eye, the skilled hand, and the trained intellect."<sup>105</sup> Or, as the president of the State Board of Horticulture bluntly asserted, "No man can succeed in this line of human effort who is careless, slovenly, and loose as a practitioner."<sup>106</sup>

What such comments suggest is that horticulture offered an arena for the white men to construct a particular kind of *middle-class* masculinity. These were not simply Jeffersonian agrarians of the eighteenth century, but men who were shaped by the culture of nineteenth-century capitalism and its corresponding social divisions.<sup>107</sup> For instance, in a discussion of recruitment and immigration efforts, one speaker before the Agricultural Society urged his colleagues to "present some other picture than the generally received typical farmer; that is a man with sunburnt cheeks, bronzed brow or horny hand in homely dress working the year round giving 'his mind to turn up furrows...."<sup>108</sup> The rise of an urban middle-class, combined with the extension of professionalization during the latter part of the century, had helped to define manhood and masculinity in new ways. Male identity intersected not only with race but with class,

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<sup>105</sup> B.M. Lelong, "California Horticulturally," in California State Board of Horticulture, *Annual Report for 1892* (Sacramento, 1892), 38-40.

<sup>106</sup> California State Board of Horticulture, *Biennial Report 1885-86* (Sacramento, 1886), 33.

<sup>107</sup> Middle-class culture and masculinity during the California Gold Rush has been well analyzed in both Roberts, *American Alchemy* and Johnson, *Roaring Camp*.

<sup>108</sup> Shorb, "Agriculture," 26.

and specialized education and training were now critical elements.<sup>109</sup> Accordingly, California horticulturists compared their work to that of the educated professions:

Proficiency in farming is as necessary as it is in any of the professions or mechanical arts....Bring to it the test of science, know the kind of material you have to work with, the chemical composition of your soil and the seed that is adapted thereto, the time to sow it, the times and methods of cultivating it, and the yield will be largely in excess of that of him who ignorantly scatters the seed and leaves its growth, development and maturity to blind chance or luck.<sup>110</sup>

Horticulture offered the opportunity to combine the virtues of farming and a close contact with nature with the newer virtues of education and professionalization.

Advocates of horticulture pointed repeatedly to the need for intelligence and study, rather than simply experience and the capacity for work. As many Californians pointed out, the emerging agricultural "sciences" -- the study of soil chemistry, meteorology, plant breeding, irrigation, etc. -- were "elevating the pursuit of husbandry into a science."<sup>111</sup>

Proponents of fruit growing exhibited an almost obsessive concern that their profession be perceived as both socially conservative and genteel. Horticulture, they argued, demanded and rewarded intellect rather than simply experience or hard labor. As one

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<sup>109</sup> On professionalization and white manhood, see Dana D. Nelson, *National Manhood: Capitalist Citizenship and the Imagined Fraternity of White Men* (Durham, NC: Duke University Press, 1998); Rotundo, *American Manhood*, 167-93.

<sup>110</sup> B. Collins, "Opening Address," *CSAS Transactions 1881-82*, p. 283.

<sup>111</sup> McKaig, "Address," 311.

proponent argued, "The vast possibilities that lie hidden in the tiny seed and the simple nut, are from the period of germination to fruition, one as interesting almost as the birth and progress of kingdoms."<sup>112</sup> The keen interest of California farmers and fruit growers in "scientific" farming was thus not merely an example of the abstraction and objectification of nature; perhaps more importantly it reflected the need on the part of farmers to see *themselves* as scientific and professional — these were the critical markers of middle-class manhood in the latter nineteenth century. In this way, the construction of the landscape (as an object of scientific study) was quite directly related to farmers' construction of their own identity (as scientific professionals).

In fact, fruit growers were correct to assert the relative meticulousness that horticulture required, at least relative to most grain crops. The trees themselves often required extra care in transplanting and pruning, particularly in the case of grape vines, if yields were to be satisfactory. But still more challenging was the harvest. All fruits required careful handling at harvest time, but crops such as raisins, figs, and peaches necessitated unmatched amounts of care in picking. Not only did they have to be picked at precisely the right stage of ripeness (in the case of raisin grapes, this was often determined by measuring the sugar content with a special device; in the case of figs and peaches by closely examining the skin), but they needed to be cut correctly and packed extremely well if they were to survive the process of shipping intact. Peaches in particular needed to be "handled as carefully as if each was an egg." Grape bunches had

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<sup>112</sup> California State Board of Horticulture, *Biennial Report 1884*, p. 51.

to be cleaned by hand, then carefully placed on trays for drying. After several days, the trays had to be turned -- a task that again required extraordinary effort to avoid damaging the fruit. Once dry, raisin clusters were graded and packed by hand, a job requiring "expert fingers."<sup>113</sup> Figs required turning once a day for several days while drying, and all the while they had to be protected from moisture, which typically meant moving them in- and out-of-doors. Prior to packing, they had to be blanched, and then, of course, "properly packed." As one fig grower admonished his colleagues, "These directions must be strictly observed if you wish to obtain a choice article."<sup>114</sup>

E.J. Wickson, editor of the *Pacific Rural Press*, stressed that this labor had noticeable subjective effects:

As man develops and improves the plant and shapes its growth to better serve honorable ends, the mental acts react upon the mind itself; it sees new beauties, it discerns new uses, it invents new methods and processes, it perceives new and more refined relations and differences.<sup>115</sup>

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<sup>113</sup> Vaught, *Cultivating California*, 62-64. For a contemporary description of raisin culture, see G.G. Briggs, "Fruit Culture," *CSAS Transactions 1881*, pp. 185-89. For a historian's account of citrus culture, see Douglas C. Sackman, "'Nature's Workshop': The Work Environment and Workers' Bodies in California's Citrus Industry, 1900-1940," *Environmental History* 5 (January 2000): 27-53.

<sup>114</sup> California State Board of Horticulture, *Biennial Report 1884*, pp. 56-57.

<sup>115</sup> *Pacific Rural Press*, 15 July 1899, cited in Vaught, *Cultivating California*, 14. See also *Pacific Rural Press*, 9 October 1897, p. 220.

Similarly, Flora Kimball, the wife of a prominent orchardist, insisted upon "the moral and mental curative properties of trees and flowers."<sup>116</sup> It was the very proximity to and involvement with the plants themselves that fostered psychological well being and moral uprightness. Such claims suggest that it was the physical act of laboring in the orchards that ultimately affected the physical and mental development of its practitioners, or so contemporaries hoped. The subjective benefits of agriculture derived from the close relationship between farmers and nature.<sup>117</sup> Moreover, the consumption of fruit offered physical benefits to laborers and non-laborers alike. As the *Pacific Rural Press* noted, "No food is healthier than perfectly ripe fruit," and "not until fruit is generally cultivated, and used as an article of diet, shall we be rid of those disorders which are sapping the life fountains of thousands of our farmers annually."<sup>118</sup> Thus through the process of remaking the landscape Californians would reap social *and* physical benefits. Nature itself was shaping a white middle class in the Central Valley.

As suggested earlier, however, one of the distinguishing features of these middle-class bodies was their very vulnerability -- particularly to exhaustion and fatigue. Thus, because of the hard labor it required, middle-class farming was potentially an oxymoron. Traditionally agrarian writers had celebrated the physical labor involved in farming.

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<sup>116</sup> Kimball, "Address of Welcome," 331-32.

<sup>117</sup> "The mind that is developed under the auspices of Agriculture, becomes too strongly wedded to the realities of life, and to the consecrated truthfulness of nature, to turn with a vigorous relish, to the fictions and follies of an artificial, and not unfrequently fantastic state of society." *California Farmer and Journal of Useful Sciences* 1 (January 1854).

Commentators, for instance, lamented the growing “aversion to manual labor” which they found particularly evident among the younger generation, and which they saw as rampant among the urban population.<sup>119</sup> Accordingly, they exalted the effects of agricultural labor in producing men who were both physically strong and morally upright. In such instances, commentators generally drew upon an older, moral discourse of work as well as contemporary understandings of manhood.<sup>120</sup> In such understandings, work was always believed to be spiritually beneficial, and, as a corollary, the capacity for work was interpreted as a sign of personal character. But as the century wore on, advocates of farming drew increasingly on contemporary beliefs about the potential for “overwork” and the corresponding need for rest. While the discourse of agrarianism asserted that proper labor improved both the environment and the human beings who labored there, farmers and agricultural writers also began to acknowledge that, when pushed beyond certain limits, labor could have negative impacts on both the environment and human beings. The *California Granger*, for instance, asserted that overwork was the “chief cause tending to injure the health of farmers,” and consequently welcomed machinery and labor-saving devices because of their ability to improve farm life and to preserve healthy bodies:

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<sup>118</sup> *Pacific Rural Press*, 8 April 1871, p. 25; “Fruit Instead of Medicine,” *Pacific Rural Press*, 10 June 1871, p. 359. See also Tyrell, *True Gardens of the Gods*, 44.

<sup>119</sup> *San Jose California Granger*, 2 July 1874.

<sup>120</sup> Daniel T. Rogers, *The Work Ethic in Industrial America, 1850-1920* (Chicago: University of Chicago Press, 1978), 1-17.

One cannot think of the revolution wrought in the *modus operandi* of farming in the past twenty-five years without a feeling of devout thankfulness that science and art are so effectually the servants of the husbandman, doing the work by steam and horse power that formerly had to be done by large expenditures of incessant manual labor, which soon wore out the body. The reaper, mower, threshing machine, and a thousand other inventions of these days have come into lighten the labor of the tiller of the soil....The full zenith of glory for the tiller of the soil is not yet come.<sup>121</sup>

The concern with overwork was not exclusive to farmers, however. In fact, as historians have long recognized, it was much more common among urban professionals where it found expression in the diagnosis of "neurasthenia" or nervousness. Typically limited to the urban middle classes, neurasthenia was defined as a failure those energy forces which activated the mind; doctors advised sufferers to withdraw from all activity and separate themselves from the pace and stimulation of modern life. Neurasthenia was explained by reference to an economy of the body in which health depended upon moderation in the expenditure of energy.<sup>122</sup> In fact, the recognition that farmers, as well

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<sup>121</sup> *San Jose California Granger*, 2 July 1874 and 8 September 1874 (quote), n.p. Richard Steven Street also quotes a former field hand who became a wheat farmer who approved of mechanization in which "machines do the heavy labor" because of the benefits to the laborer's body. As he described the old days, "Men of sixty to seventy years of age...carry the marks on their hands, as I do, of the old reap-hooks that drew blood by the merest wayward stroke, and who remember the thump, thump, thump, of the flail on the old barn floor as strong men separated the grain from the straw during the cold winter days." *Pacific Rural Press*, 11 August 1894; cited in Street, "Tattered Shirts, Ragged Pants," 589.

<sup>122</sup> Rotundo, *American Manhood*, 185-93. Cynthia Eagle Russett, *Sexual Science: The Victorian Construction of Womanhood* (Cambridge, MA: Harvard University Press, 1989), 112-113. At the same historical moment, Americans showed a growing interest in leisure; rest, play, and relaxation all became

as professionals, suffered from overwork was a sign of their own middle-class status. Contemporary concerns with both physical and mental strain suggested an emerging concern with objectively defined limits of the (middle-class) human body. A doctor writing in the *Pacific Rural Press* in 1871, for instance, advised readers that in order to avoid seasonal disease it was necessary to avoid “great mental and physical fatigue.”<sup>123</sup>

In contrast, the bodies of non-white men, particularly Chinese men, were cast as capable of literally *inhuman* amounts of work. Discussions of agricultural labor frequently focused on the bodily as well as the moral differences between Chinese and white laborers.<sup>124</sup> Supposed physical differences were then twisted into an a rationalization for paying the Chinese lower wages. One of the most oft-repeated comments about the Chinese was their ability to subsist “only” on rice and yet still perform large amounts of work. As one contemporary explained:

The life of the average Chinaman has been a mere struggle for animal existence. He bears with him the heredity of poverty and unrelenting toil for food through thousands of years. His physical organs have become adapted to insufficient food. There has been a process of selection going

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prescriptions for the increasingly fatigued and overworked body. See Rogers, *The Work Ethic*. Rogers, however, interprets the interest in leisure as evidence of the decline of the “work ethic”; yet it is also possible to view it as a positive response to the rise of a physiological view of the human body.

<sup>123</sup> “Diseases Incident to the Season,” *Pacific Rural Press*, 30 September 1871, p. 199.

<sup>124</sup> Information on nineteenth-century farm labor wages is sketchy, but most narrative sources suggest that in the 1870s Chinese laborers were typically paid \$1.00/day, while white labor was paid \$1.50/day. See, for instance, *Debates and Proceedings of the Constitutional Convention of the State of California, Convened at the City of Sacramento, Saturday, September 28, 1878* (Sacramento, 1880-1881), 647, 661. Most sources suggest that white labor earned from 30 to 50% more than Chinese labor in the period. See also, Chan, *This Bittersweet Soil*, 327-28; Chiu, *Chinese Labor in California*, 81-82.

on in China under which the heavy feeders have fallen out, and under the law of the “survival of the fittest” none but those who can practice the most rigid self-denial as to food remain....The result of this life is a sinewy, shriveled human creature, whose muscles are as iron, whose sinews are like thongs, whose nerves like steel wires, with a stomach case lined with brass; a creature who can toil sixteen hours of the twenty-four; who can live and grow fat on the refuse of any American laborer’s table.<sup>125</sup>

As this passage suggests, the capacity for work on the part of the Chinese was equated not with a physical masculinity nor with moral virtue and self-restraint, but with animality. Non-white bodies were presumed to function differently. Race determined the subjective effects of labor -- whether, for instance, labor produced manhood or reduced one to the condition of an animal. It was not simply that non-whites were associated with the body and whites with the mind; racial discourse was both more complex and more contradictory than that. Race actively mediated the physical and moral effects of labor.

It was not, however, only whites that were subject to overwork, but the natural environment that they inhabited. White farmers read their own concern with overwork and physical exhaustion back onto the landscape itself. Here farmers drew analogies between vulnerable middle-class bodies and a vulnerable landscape. For instance, by the 1870s, Californians were attributing declining yields in some regions to “soil exhaustion.” Like men, land could be worn out by overwork and required adequate rest

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<sup>125</sup> *Debates and Proceedings of the Constitutional Convention*, quote from 633; see also 661-662.

if it were to function properly. As one agricultural publication told its readers, “The land needs rest like the farmer himself and his work animals.”<sup>126</sup> Or, as a farmer told a representative of the State Engineer’s Office, he regarded dry years as advantageous because they afforded “rest to the land.”<sup>127</sup> As wheat yields began to decline in some areas during the 1880s, California’s agricultural publications urgently discussed the concern that poor farming practices were wearing out California’s soil. The prescribed remedy was one of rest (fallowing) in addition to nourishment (fertilization):

Let me ask you, farmers of the Sacramento Valley, are not pushing your lands... to sterility and death? The necessity for feeding land is no less than that for feeding stock. The physical force of work horses and cattle is depleted by continuous labor, but the supply is kept, and a healthy condition of blood, bone, and muscle is secured by rest and an abundance of nutritious food; otherwise they would grow weak, unfit to work, and finally die.<sup>128</sup>

Arguments about soil exhaustion were also part of the call for diversified agriculture, particularly horticulture. Declines in wheat yields were interpreted as evidence of wheat’s sterilizing effects. As Norton Chipman argued, “successive croppings of wheat

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<sup>126</sup> *Pacific Rural Press*, 30 September 1871, p. 195.

<sup>127</sup> [C.E. Grunsky], “Field Notes,” April-May 1881, book 15, p. 47, State Engineer’s Department – William Hammond Hall Papers, Acc. 91-06-10, CSA. See also, J. Bidwell, “Address,” *CSAS Transactions 1881*, p. 32.

<sup>128</sup> B. Collins, “Opening Address,” *CSAS Transactions 1881-82*, p. 285.

impoverish the soil and diminish the average yield...."<sup>129</sup> As the social forms generated by wheat -- i.e., a large labor force of itinerant males -- failed to reproduce middle-class culture, so did wheat fail to reproduce itself over time.

On the one hand, such readings of human physical characteristics onto the landscape was one way in which nineteenth-century individuals tried to make sense of new and strange environments. As Conevery Bolton has argued, ante-bellum Americans saw human bodies and the environment operating in parallel ways.<sup>130</sup> In fact, such analogies between landscape and bodies can be traced back to ancient sources. Yet, by the 1870s, the application of terms like "exhaustion" to both soil and bodies needs to be understood in the context of late nineteenth-century organicism, and the growing recognition that the same scientific principals governed all of nature, including human bodies. Among mid-nineteenth century intellectuals, it was Alexander von Helmholtz's theory of the conservation of energy that provided the basis for conceptualizing the organic and inorganic worlds as governed by the same set of forces.<sup>131</sup> These intellectual developments merged easily into popular thinking that already drew analogies between the environment and the human body. But now these relationships were cast in physical and material, rather than simply analogical or metaphorical, terms. Land, animals, and

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<sup>129</sup> Chipman, "Wheat vs. Fruit," 305.

<sup>130</sup> Conevery A. Bolton, "The Geography of Health and the Making of the American West: Arkansas and Missouri, 1800-1850," in *Medical Geography in Historical Perspective*, ed. Nicolaas Rupke, forthcoming.

<sup>131</sup> Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (New York: Basic Books, 1990).

human beings all operated in the very same physical economy of energy.<sup>132</sup> They were governed by the same forces. As one doctor wrote in the *Pacific Rural Press*, "The laws of health are simply the laws of nature. This is the principle upon which the intelligent management of the body rests. Our powers being Nature's power, are subject to the same conditions which pervade the rest of the world."<sup>133</sup>

In this reading, California's landscape was itself a kind of middle-class body. The earth itself, much like white bodies, was vulnerable and suited only to particular kinds of farming. Wheat farming, in contrast to horticulture, degraded the landscape as it degraded (and racialized) its laborers. Moreover, the landscape itself was contributing to the creation of civilization and the reproduction of civilized individuals -- or at least that was what was implied by those who asserted the "moral effects" of trees and the psychological benefits of horticulture. When agrarians spoke of the "laws of nature," they invoked a peculiarly white and presumably middle-class nature.

For nineteenth-century Californians, the landscape was not merely a set of potential resources but an active agent in the shaping of their collective destiny. Agrarian discourse yoked nature into the project of shaping a white middle-class culture in the Far

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<sup>132</sup> As one fruit grower remarked at the meeting of the State Horticultural Society, "the crystal age, the plant age, and the animal age define the grand divisions of matter....Within this grand trinity of Nature also circles and centers all inorganic and organic substance. The life principle and function inherent in, and raining through all, is largely interchangeable." O.H. Conger, "Address of Welcome," California State Board of Horticulture, *Report 1890* (Sacramento, 1890), 44.

<sup>133</sup> *Pacific Rural Press*, 24 June 1871, p. 391.

West. They socialized the landscape at the same time that they naturalized their own cultural projects, even though they themselves would not have understood such terminology. Instead their worldview mixed the social and the natural so thoroughly that it borders on anachronism to tease them apart.<sup>134</sup> Trees imparted moral qualities. Forms of agriculture and society followed a natural evolutionary process. Agriculture was an essential characteristic of certain races. The landscape itself helped to foster racial and sexual difference. In these ways human bodies and the environment interpenetrated one another as farmers labored to create an agricultural landscape. Farmers struggled to finish a landscape that would come to shape those who occupied it.

Moreover, as discussions of agrarianism and agricultural labor suggest, these connections between human bodies and the landscape were understood not merely in ideological or metaphorical terms, but were experienced in quite direct and physical ways. The individual body's own health and proper functioning depended upon its relationship to the surrounding landscape. In fact, it was through concerns over health -- and more particularly, disease -- that nineteenth-century Americans drew the most immediate connections between themselves and their environment. Here the discourse was decidedly less optimistic than that of agrarian improvement and "civilization." Not only was the California environment perceived as unhealthy for Anglo-American

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<sup>134</sup> In *We Have Never Been Modern*, Bruno Latour emphasizes that the separation of the natural and the cultural is one of the defining features of modernity, which he traces to the European Enlightenment. I am suggesting here, however, that in the lives of nineteenth-century farmers at least, the separation was not so complete as Latour suggests.

migrants in certain localities, but their efforts to transform that landscape might potentially threaten their own well-being. The connection between bodies and landscape could, in some cases, challenge both settlement and the discourse of environmental finishing.

### *Chapter Three*

#### **Disease**

When George Derby recorded his observations of the San Joaquin Valley in 1850, he set out to describe an unfamiliar terrain to his superiors in the Corps of Topographical Engineers. Derby was a Corps surveyor sent to California to locate a site for an Army Post in the aftermath of the Gold Rush. Derby's instructions were to consider the relevant factors for locating a camp, including the availability of water and food, the attitude of local Indians, the presence of building materials, and the accessibility of communication routes. Yet among the things which Derby described in considerable detail was the physical appearance of the various Indians that he encountered. Derby described the condition of an Indian he met near Tulare Lake as "meagre," while in contrast, noted that a group of Indians along the Kaweah River were "remarkably healthy, and though by no means beautiful,...comparatively well favored." Along the Kings River, he described the natives he encountered as "the finest looking Indians I have met with in the valley. All that came over to our encampment were large well built athletic men, nearly six feet high,

and their physiognomy struck me as less repulsive than that of the...other Indians whom we had seen."<sup>1</sup>

The pervasive nineteenth-century belief in white supremacy and the corresponding obsession with racial difference undoubtedly shaped Derby's observations, but these alone do not account for the descriptions of Native American physiognomy in his official report. His careful accounts of physical difference among Indians can also be interpreted as part of his assessment of the land itself. As a nineteenth-century American, Derby most likely correlated human appearances and health with the surrounding environment, and thus as indicators of the land's attractiveness for white settlement.<sup>2</sup> Despite the environmental optimism of agrarianism, nineteenth-century travelers and immigrants were often wary of how they would fare in new surroundings. At the level of practice, they subscribed to a kind of environmental determinism. As discussions of agricultural labor suggest, they saw human beings as enmeshed in, and affected by, the landscape they inhabited. Thus in reporting on the appearance of various Indians, Derby was merely

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<sup>1</sup> George H. Derby, "The Topographical Reports of George H. Derby," part 2, ed. Francis P. Farquhar, *California Historical Society Quarterly* 11 (September 1932), 248, 253, 257, 259.

<sup>2</sup> This is one of the principal insights of Conevery Bolton's dissertation, "The Health of the Country: Body and Environment in the Making of the American West, 1800-1860," (Ph.D. diss., Harvard University, 1998). I am indebted to Conevery for sharing her work with me; it has been essential to this chapter. In California, similar observations on the relationship between Indian health and the landscape were made by an early settler in the Sacramento Valley, L.F. Moulton: "Most undeniable is the proof of the inherent value of her soil, the beneficence of her climate, and the purity and healthfulness of her crystal river, when it is known that in savage days...there were in this tribe of Indians that occupied the site of the present town of Colusa, thousands of members, while other tribes numbered probably one tenth as many, and that *all* acknowledged the Colusa tribe as the lawgivers, and their village as the capital of the whole country." Moulton, "The Fruit Interest in the Great Northern Sacramento Basin," in California State Board of Horticulture, *Biennial Report, 1885-86* (Sacramento, 1887), 286-87.

fulfilling his instructions to give “particular attention...to the collection of such information as may be useful in guarding against the selection of an unhealthy position....”

Our own experience of sickness and health is one of the principal standpoints from which we evaluate our environment. In this way we perceive ourselves to be embedded in certain places, for better or for worse. Although modern medical discourse has done much to attenuate this perceived link and to relocate the sources of illness within our own DNA, we still carry notions of healthy and unhealthy climates and places. Such notions were much more strongly held in the nineteenth century and were not limited to lay people. Both professional and popular understandings of health rooted human bodies in their surrounding environment. Doctors, engineers, and settlers all assumed that health and disease were qualities that inhered in particular landscapes.

In the Central Valley, the correlation between bodies and landscape emerged most forcefully in the concern over malaria. As the historical geographer Kenneth Thompson has observed, despite California’s overall reputation for healthfulness, the valley was known, and avoided, as a region of “intermittent” or “malarious” fever. Malaria offers an example of an unquestionably corporeal link between bodies and landscape which individuals of the period struggled to place within existing cultural frameworks. In nineteenth-century thinking, human beings were never clearly distinct from the

environment they inhabited. The race, shape, stamina, and well being of individual bodies was tied to the landscape in which they lived and worked.<sup>3</sup>

At the same time, as the desire and ability to transform the landscape in ever more radical fashion grew, individuals had to confront the effects of that transformation on their own bodily selves. If the health of bodies was dependent upon the environment, changes to that environment might well have unpredictable impacts on those who lived there. In nineteenth-century California people of different classes and with different interests -- settlers, boosters, engineers, and doctors -- all engaged in discussions about the relationship between environmental transformation and health. These discussions existed alongside and in tension with discussions of the processes of environmental change in which Anglo-Americans were actively engaged: mining, agriculture, irrigation, reclamation. Local experience, professional knowledge, and economic and cultural desires all conditioned these conversations in different times and places. Although Californians did not surrender their desire to rework the landscape for economic gain, such efforts were often underlain by considerable anxiety. Intellectually, many struggled

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<sup>3</sup> Kenneth Thompson, "Insalubrious California: Perception and Reality," *Annals of the Association of American Geographers* 59 (March 1969), 50-64; Kenneth Thompson, "Irrigation as a Menace to Health in California," *Geographical Review* 59 (April 1969), 195-214. Thompson's articles pointed me to several of the primary source materials I analyze here, particularly the reports of the California State Board of Health. Despite concerns over disease in the Central Valley, however, overall California had a reputation for healthfulness in this period. See John E. Baur, *The Health Seekers of Southern California, 1870-1900* (San Marino: The Huntington Library, 1959).

to devise environmental understandings that would accord more easily with their economic desires, but this was not a simple task.

The concern over environmental disease is a largely forgotten sidelight of the valley's history, which has to do with both the nature of history and the nature of malaria. In fact, the only existing histories of malaria in the Valley have been written by entomologists and a historical geographer. These have been positivist in their tenor, emphasizing the inadequacy of nineteenth-century science to delineate the true causes of disease.<sup>4</sup> The relative inattention of California historians to malaria is partially accounted for by the fact that discussions of malaria are only very rarely foregrounded in the local historical records, and then only by physicians. While nineteenth-century Californians devoted considerable space to discussions of agriculture, mining, land monopoly, irrigation and reclamation, and many other topics, malaria is generally mentioned only in passing. This is best explained by its very pervasiveness; the disease was so common in many regions of the west that it often did not warrant discussion, though its prevalence can be gauged in part by the steady stream of advertisements for "ague pills" and other patent medicines that appear in agricultural papers of the period.<sup>5</sup> At the same time, among populations of European origin, malaria was often persistent rather than fatal. Those who were afflicted with mild cases, or "a touch of the ague,"

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<sup>4</sup> Harold Farnsworth Gray and Russell E. Fontaine, "A History of Malaria in California," *Proceedings and Papers of the Twenty-Fifth Conference of the California Mosquito Control Association* (Turlock, CA: California Mosquito Control Association, 1957); Thompson, "Insalubrious California."

simply took their pills or quinine and went about their daily lives as best as they were able, seemingly viewing their condition as unremarkable.<sup>6</sup> And while severe cases might be incapacitating, “fever and chills” were nonetheless an accepted risk of Western settlement for many. It is easy for modern historians to overlook such a disease because it is so hard for us to recognize the historical nature of bodily experience. We can assume too easily that bodies, like nature, lie outside of history.<sup>7</sup>

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<sup>5</sup> See for instance, *Colusa Sun*, 11 January 1862, 16 May 1863 and many other dates.

<sup>6</sup> Several sources mention the relative mildness of malaria in parts of California, although in some cases this may be attributed to the conscious desire to downplay disease in order to encourage settlement. More reliable in this respect are the comments of physicians. For instance, W.P. Tilden, M.D. wrote, “I live in a part of the Sacramento Valley known and acknowledged to be sickly, yet the rate of mortality will compare favorably with any other part of the State, and for the reason that the diseases, like those in and about Stockton, though prevailing to a great extent, especially during the summer and autumn, are of a character comparatively easy to control.” In “Memorial of W.P. Tilden, M.D. to the Legislature of California on the Treatment, Management and Care of the Insane in California,” in California Legislature, *Appendix to the Journals of the California Senate and Assembly (JCSA)* 18:3 (1870), 18. According to the State Board of Health, “The ordinary forms of paludal fevers yield readily to quinine, and those living in regions where they prevail seldom call a physician to their aid, being content to take their quinine with their coffee as a morning beverage.” California State Board of Health, *Ninth Biennial Report, 1884-86* (Sacramento, 1886), 70. See also, [Thomas M. Logan], “Report on the Medical Topography and Epidemics of California,” *Transactions of the American Medical Association* 12 (1859), 92; Philip King Brown, “The Malarial Fevers of the Sacramento and San Joaquin Valleys,” *Transactions of the Medical Society of the State of California* 29 (April 1899), 273; H. Worthington, “Fevers in Southern California,” California State Board of Health, *Fifth Biennial Report 1878-79* (Sacramento, 1879), 16.

<sup>7</sup> For discussions of the historical experience of disease, see Bolton, “The Health of the Country,”; Erwin H. Ackerknecht, “Malaria in the Upper Mississippi Valley, 1760-1900,” *Supplements to the Bulletin of the History of Medicine No. 4* (Baltimore: Johns Hopkins University Press, 1945), 1-14; Barbara Duden, *The Woman Beneath the Skin: A Doctor's Patients in Eighteenth-Century Germany*, trans. Thomas Dunlap (Cambridge, MA: Harvard University Press, 1991); Darrett B. Rutman and Anita H. Rutman, “Of Agues

Malaria did not become endemic to California until the early nineteenth century. Most likely it arrived in the Upper Sacramento Valley in the summer of 1832 via a party of the Hudson Bay Company led by John Work, which trapped beaver along the rivers of the Sacramento and San Joaquin Valleys. Among Work's party, a few members already had had the disease, and in September of 1833, as the party was leaving the mosquito-ridden swamps of the Sacramento-San Joaquin Delta, severe fever attacked most of the men. Five men died, and sixty-five out of a party of one-hundred were affected.<sup>8</sup> That same season a malaria epidemic devastated Native American populations in the region, killing at least twenty-thousand native people within the state according to estimates made in 1955 by the physiologist Sherburne Cook.<sup>9</sup> *Anopheles* mosquitoes are, most

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and Fevers: Malaria in the Early Chesapeake," in *Biological Consequences of European Expansion, 1450-1800*, ed. Kenneth F. Kiple and Stephen V. Beck (Aldershot, G.B.: Ashgate, 1997), 202-32.

<sup>8</sup> The principal primary source for this conclusion is the journal of John Work which has been published as *Fur Brigade to Bonaventura: John Work's California Expedition, 1832-1833, for the Hudson's Bay Company*, ed. Alice Bay Maloney (San Francisco: California Historical Society, 1945). For the secondary literature which addresses the origins of malaria in California, see Sherburne F. Cook, "The Epidemic of 1830-33 in California and Oregon," *University of California Publications in American Archaeology and Ethnology*, 43 (1955), 303-26; Gray and Fontaine, "A History of Malaria in California," 21-23; Harold Farnsworth Gray, "The Confusing Epidemiology of Malaria in California," *American Journal of Tropical Medicine and Hygiene* 5 (May 1956), 411-18. Cook allows for the possibility that malaria might have been introduced earlier by other fur trappers, but the timing of the epidemic in California suggests that Work's party was the source of the outbreak. See Robert T. Boyd, "The Introduction of Infectious Diseases Among the Indians of the Pacific Northwest, 1774-1884," (Ph.D. diss., University of Washington, 1985), 126-27.

<sup>9</sup> The California epidemic was part of a larger outbreak that had begun in Vancouver, British Columbia in 1829, and which was most likely introduced by ship passengers. Malaria epidemics such as that of 1829-1833 are exceedingly rare; thus, while malaria is not typically foregrounded in primary sources of the period, this epidemic was extensively discussed for a full generation afterwards. Contrary to popular perceptions, the disease virulently attacked whites as well as Indians, although mortality among the latter was orders of magnitude higher, which is explained largely by different cultural practices, especially the use of quinine by whites. See Boyd, "The Introduction of Infectious Diseases," 133-38; Cook, "The Epidemic of 1830-33 in California and Oregon."

likely, native to the region, and it is probable that these insects, along with human beings, provided adequate hosts for the disease once it reached California.<sup>10</sup> The result was the development of local regions of severe endemicity, particularly along the rivers of the Sierra foothills and Central Valley. By 1839, one traveler observed that “the prairies of the interior are pestilential and diseases abound.”<sup>11</sup> For the rest of the century, seasonal outbreaks of disease were an expected occurrence in California’s interior.

It was during the Gold Rush that the problem of sickness and malaria in the valleys was widely recognized and almost certainly exacerbated, as new carriers entered the region and the crowded conditions and poor sanitation of many of the mining camps facilitated the spread of disease.<sup>12</sup> Travelers during the period considered illness almost a certainty for anyone who remained in the valley lowlands for any length of time.<sup>13</sup> The physician James Tyson referred to the tule marshes as “nurseries of disease,” and remarked that he could “conceive of no part of the Mississippi valley more prolific of

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<sup>10</sup> Gray and Fontaine, “A History of Malaria,” 20-21. Several nineteenth-century sources mentioned the presence of large numbers of mosquitoes in the region. See, for instance, Thomas Kerr, “An Irishman in the Gold Rush: The Journal of Thomas Kerr,” ed. Charles L. Camp, *California Historical Society Quarterly* 8 (March 1929), 18; C.S. Lyman, “The Gold Rush: Extracts from the Diary of C.S. Lyman, 1848-1849,” ed. Frederick J. Teggart, *California Historical Society Quarterly* 2 (October 1923), 183.

<sup>11</sup> Congress, House, “Mr. Kelley’s Memoir,” 25th Cong., 3rd sess., 1839, H. R. 101, Appendix O, 50.

<sup>12</sup> For problems of disease and sanitation in the mining camps, see Malcolm J. Rohrbough, *Days of Gold: The California Gold Rush and the American Nation* (Berkeley: University of California Press, 1997), 192. Rohrbough, however, does not mention malaria in his text. Also Susan Lee Johnson, *Roaring Camp: The Social World of the California Gold Rush* (New York: Norton, 2000), 127-30.

<sup>13</sup> Dr. J. Praslow, *The State of California: A Medico-Geographical Account* (1857; reprint, San Francisco: John J. Newbegin, 1939), 58-59.

disease, than the valley of the Sacramento must be.”<sup>14</sup> Newspapers from the period often mentioned the problem of disease in the camps, attributing it to “miasmatic poison” that collected in the reservoirs and ditches, and diaries of the argonauts themselves confirm the presence and virulence of “fever and ague” in both the valley and the camps.<sup>15</sup> In his reconnaissance of the region for the Army in 1850, George Derby reported that at Sutter’s farm and all along the nearby Yuba River most of the occupants suffered from periodical fever, to which several deaths had been attributed.<sup>16</sup> John Audubon, visiting Sutter’s Fort ten years later, wrote that “fever and ague” were “very prevalent,” and that some farmers told him that nothing could induce them to settle in such a place.<sup>17</sup>

It was not until 1898, however, that the relationship between malaria and mosquitoes was uncovered.<sup>18</sup> Before, and even after, that time, Californians struggled with a more complex and integrated understanding of their relationship between human beings and their environment. Intermittent, autumnal, or bilious fever, chills, “fever and

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<sup>14</sup> James L. Tyson, *Diary of a Physician in California, Being the Results of Actual Experience Including Notes of the Journey by Land and Water, and Observations on the Climate, Soil, Resources of the Country, Etc.* (1850; reprint, Oakland, CA: Biobooks, 1955), 66.

<sup>15</sup> Several undated newspaper quotes appear in Thomas M. Logan, “Malarial Fevers and Consumption in California,” California State Board of Health, *Third Biennial Report, 1874-75* (Sacramento, 1876), 117-18; Thomas Kerr, “An Irishman in the Gold Rush: The Journal of Thomas Kerr,” ed. Charles L. Camp, *California Historical Society Quarterly* 8 (June 1929), 180-82.

<sup>16</sup> George H. Derby, “The Topographical Reports of George H. Derby,” ed. Francis P. Farquhar, *California Historical Society Quarterly* 11 (June 1932), 110.

<sup>17</sup> John W. Audubon, *Audubon’s Western Journal: 1849-1850*, ed. Frank Heywood Hodder (Cleveland: The Arthur H. Clark Company, 1906), 234, 237.

<sup>18</sup> Gordon Harrison, *Mosquitoes, Malaria and Man: A Short History of the Hostilities Since 1880* (New York: E.P. Dutton, 1978), 99.

ague," and "Sacramento fever" -- all synonyms for what we would now label malaria -- were attributed to "miasma."<sup>19</sup> While miasma eluded precise definition, most frequently it was presumed to be a naturally occurring fog or vapor that caused disease, particularly those diseases associated with warm, humid environments. Miasma was not a disease itself, but a quality of the environment. The most widely held theory was that miasma or malaria, literally "bad air," was generated by decaying vegetable matter. Decomposing organic material gave off a poison that lingered in the atmosphere. This miasma, when inhaled, caused sickness.<sup>20</sup> Miasma, in other words, directly linked landscape and human bodies.<sup>21</sup>

As discussions of miasmatic fog suggest, the atmosphere was typically construed as the primary link between human bodies and the landscape.<sup>22</sup> For instance, physicians

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<sup>19</sup> Even after the mosquito discovery, many California physicians were not convinced that mosquitoes were the only pathway by which malaria was transmitted. For instance, in an article published in 1899, "The Malarial Fevers of the Sacramento and San Joaquin Valleys," the physician Phillip King Brown discusses both aerial and water transmission and discusses the links between irrigation and malaria, without apparently making the link between irrigation and mosquito habitat. According to Gray and Fontaine, mosquito control operations were not undertaken in California until 1909. Gray and Fontaine, "A History of Malaria," 26; Ackerknecht, "Malaria in the Upper Mississippi Valley," 6.

<sup>20</sup> One English sanitarian described the process in the following manner: "When diffused in the air, these noxious particles are conveyed into the system through the thin and delicate walls of the air vesicles of the lungs in the act of respiration. The mode in which the air vesicles are formed and disposed is such as to give to the human lungs an almost incredible extent of absorbing surface, while at every point of this surface there is a vascular tube ready to receive any substance imbibed by it, and to carry it at once into the current of the circulation. Hence the instantaneousness and the dreadful energy with which certain poisons act upon the system when brought into contact with the pulmonary surface." Quoted in C-E. A. Winslow, *The Conquest of Disease* (Princeton: Princeton University Press, 1943), 249, cited in Thompson, "Insalubrious California," 55.

<sup>21</sup> This link is fully elaborated in Bolton, "The Health of the Country," especially pp. 134-88.

<sup>22</sup> Bolton, "The Health of the Country," 146.

devoted considerable attention to seasonal winds which were believed to transport both healthful and unhealthful qualities. In the Central Valley particularly problematic were the north winds which, according to observers and residents, had deleterious effects on plants, animals, and humans. Among the health problems attributed to these winds were rheumatism, neuralgia, sluggishness, depression, and respiratory problems. Winds were typically believed to derive their qualities from the lands over which they traveled. George Derby's instructions, for instance, had asked that he "ascertain, if practicable, the direction of the prevalent winds during the summer and fall months, and the nature of the country (whether marshy or otherwise) over which they pass." Similarly, some hypothesized that the north winds derived their disagreeable characteristics from the dry land over which they traveled, especially the lava beds of Northern California.<sup>23</sup>

Still nineteenth-century Anglo-Americans acknowledged an uncertainty about their environment and its functioning. While they knew that they were susceptible to the environment, they did not understand the mechanisms of that susceptibility. For instance, some argued that the malignant qualities of north winds arose from their electrical properties rather than from the lava beds, while others argued that the north winds affected only certain individuals.<sup>24</sup> Similarly, despite attempts to accurately describe

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<sup>23</sup> J.H.C. Bonte, "The Northerly Winds of California," California State Agricultural Society, *Transactions 1881* (Sacramento, 1881), 201-13; Derby, "The Topographical Reports of George H. Derby," part 2, p. 248.

<sup>24</sup> Bonte, "The Northerly Winds"; "Report on the Medical Topography and Epidemics of California," *Transactions of the American Medical Association* 16 (1865), 536.

miasmatic disease and its mode of transmission, there were serious disagreements among both medical professionals and lay people. Dr. Daniel Drake, the pre-eminent nineteenth-century authority on environmental disease in the Mississippi Valley, noted that while decaying organic matter was one of the conditions necessary to the production of miasma, the mode of operation was unclear. He suggested two possibilities: it might either supply the material out of which a poisonous gas was formed, or, alternatively -- in a foreshadowing of germ theory -- he suggested that organic matter might harbor "animalcular or vegetable germs," that were released into the air under certain environmental conditions.<sup>25</sup> In addition, doctors argued over the disease's gestation period. Some people seemed to fall sick immediately after exposure to miasmatic vapors, while others might not manifest any problems for days. More significant was the disagreement over the routes of transmission. While most authorities argued that malaria was transmitted through the air, a substantial minority argued that miasma came from "bad water."<sup>26</sup>

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<sup>25</sup> Daniel Drake, *Systematic Treatise on the Principal Diseases of the Interior Valley of North America*, reprinted in Henry D. Shapiro and Zane L. Miller, *Physician to the West: Selected Writings of Daniel Drake on Science and Society* (Lexington: University Press of Kentucky, 1970), 358-59. Drake was one of several leading medical practitioners in the mid-nineteenth century who espoused an "animalcular hypothesis" for the origins of disease, which held that diseases were caused by microscopic "animalcula." For a brief discussion of the debates, see Ackerknecht, "Malaria in the Upper Mississippi Valley," 12-14. It would be a mistake, however, to draw too great of a distinction between animalcular and miasmatic theories. In both cases, physicians often believed that disease was carried by winds and conditioned by local environmental conditions. For this debate in California, see Sacramento Society for Medical Improvement, "Minutes," vol. 1 (May 1868), 5, California State Library.

<sup>26</sup> A report in the *Pacific Record of Medicine and Surgery* argued that: "in all malarious countries, the chief source has been found in the water from streams and wells. And the prevalence and character of these fevers, has always been in proportion to the amount of impurities contained in the water supply, rather than

While there were considerable disagreements over the precise causes of disease, most acknowledged that diseases could be traced to specific regions and localities. A medical columnist for the *Pacific Rural Press*, a California agricultural paper, noted that particular regional environments within California produced their own diseases. Low and marshy areas produced chill fever and bilious fever; the southern areas of the valley produced congestive and yellow fever; while the healthier localities produced merely dysentery, pleurisy, and attacks of indigestion.<sup>27</sup> In other words, the local environment conditioned an individual's experience of her own body, and, conversely, the quality of the environment could be read quite literally from the bodies that lived there.<sup>28</sup> In an article published in 1851, Dr. J.F. Henry described the environment and settlers of the river bottoms of Iowa:

The inhabitants no matter from what region they come, soon become subjects of some form of...bilious disease, and unless they fly from their homes, they are again and again attacked, until the constitution is broken down, and some organic disease supervening, they sooner or later sink into the grave the victims of malaria. But this may be protracted for many years, the patient becoming listless, sluggish, good-for-nothing, and

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from the exhalations of miasmatic soil." C.W. Moore, "Water: Its Impurities, Gathered from the Air and Earth," *Pacific Record of Medicine and Surgery* (15 March 1888), 46. Some individuals were willing to credit both pathways. See, for instance, Abbot Kinney's description of airborne and waterborne infection in Kinney, *Eucalyptus* (Los Angeles: B.R. Baumgart, 1895), 132-33.

<sup>27</sup> *Pacific Rural Press*, 30 September 1870.

<sup>28</sup> Bolton, "Geography of Health," 530.

carrying with him visceral enlargements of great size....These dwellers on the bottoms must be a short lived race, nor are they a prosperous one; owing to sicknesses they tend their crops badly, and thus from year to year they fall behind their neighbours on the uplands.<sup>29</sup>

In this passage, Henry suggests the regional character of disease and also implies that the environment itself was primarily responsible for an individual's appearance and even economic class.<sup>30</sup> One of California's early detractors, the Englishman Arthur Johnson, offered similar observations on the appearance of those who had tried to settle the Central Valley:

I met dozens of families, fever-stricken men, women, and children, with pale, thin faces and trembling limbs, with all their worldly possessions on board a ramshackle buggy, or some such vehicle, drawn by a broken-hearted horse or mule. They were fleeing to the sea from the plague which wrought havoc with their constitutions....In the disease-stricken, interior valleys of California, every summer adds more sacrifices to the multitude of wrecked constitutions and devitalised lives....<sup>31</sup>

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<sup>29</sup> J.F. Henry, "Medical Topography, Climate and Diseases of Iowa," *Western Medico-Chirurgical Journal* (1858), 298-307; cited in Ackerknecht, "Malaria in the Upper Mississippi Valley," 39-40.

<sup>30</sup> Contemporaries also attributed psychological qualities, such as temperament, to environmental conditions. See, for instance, *San Francisco Alta California*, 25 June 1867; *Pacific Rural Press*, 10 June 1871.

<sup>31</sup> Arthur T. Johnson, *California: An Englishman's Impressions of the Golden State* (London: Stanley Paul & Co., [1913]), 265-66.

This presumed association between disease and environment underwrote the nineteenth-century science of medical topography. In the decades before germ theory was widely accepted or understood, scientists and lay people located the source of disease in both the inherited dispositions of individuals and in the landscape, reflective of the fact that individuals in this period assumed that disease was not typically transmitted among people or animals but emanated directly from the land.<sup>32</sup> If particular landscapes were assumed to be intrinsically either healthy or disease-ridden, then successful settlement hinged on a proper identification. For instance, information on California directed at potential settlers typically commented on the healthfulness of particular localities and the physical condition of the current population.<sup>33</sup>

Among the members of California's early medical establishment, medical topography was a subject of particular concern. Because of its varied climates and geography, California, many believed, offered a unique laboratory for uncovering the links between climate and health. The California State Board of Health, formed in 1870,

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<sup>32</sup> Caroline Hannaway, "Environment and Miasmata," in *Companion Encyclopedia of the History of Medicine*, ed. W.F. Bynum and Roy Porter (London: Routledge, 1983), 1:292-308. This is, however, a generalization. See also Charles Rosenberg, *The Cholera Years: The United States in 1832, 1849, and 1866* (Chicago: University of Chicago Press, 1962), and Bolton, "Geography of Health," 181-82.

<sup>33</sup> On settlers' anxieties, see Bolton, "The Health of the Country," esp. chapter 1. In a pamphlet intended to promote settlement in Kern County, California, various settlers responded to questions about soil fertility, appropriate crops, economic requirements, and climate and health. *Settlers' Experience in Kern County, California as Related by Themselves with Advice to Newcomers* (Bakersfield, CA, 1894). There is an interesting irony here in that even while the state was promoting itself as a sanatorium to middle and upper class migrants, agricultural settlers took up land in the Central Valley despite the acknowledged presence of disease. On those who migrated to California for health reasons, see Baur, *The Health Seekers of Southern California*.

based its mission on medical topography and devoted much of its biennial report for the next thirty years to discussions of the state's different climatic zones and their relationship -- both curative and causal -- to various diseases. As the author of the Second Biennial Report noted:

There can be no question...that the extent of territory, and variety of climate and soil, within the limits of the State, render it a peculiarly favorable one for gaining valuable and comprehensive knowledge of the influence of various conditions upon the rate and causes of mortality. There is an opportunity to compare, in degrees of latitude; sea levels with elevations of eight thousand to ten thousand feet; and, what affords an unusual contrast, seacoast valleys chilled by an Arctic current, with vast interior prairies of almost tropical temperature. Doubtless, when sufficient time shall have been given to the study of these conditions... the result will be a demonstration of important relations between them.<sup>34</sup>

Similarly, Dr. F. W. Hatch, in a speech before the Sacramento Society for Medical Improvement, noted that disease in California was often present "in types and phases different from those once familiar in other states." Thus he admonished his colleagues on their duty to classify those diseases and variations "peculiar" to their new home.<sup>35</sup>

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<sup>34</sup> California State Board of Health, *Second Biennial Report, 1871-73* (Sacramento, 1873), 103.

<sup>35</sup> F.W. Hatch, *Sixth Anniversary Address Before the Sacramento Society for Medical Improvement*, March 1874 (San Francisco: Joseph Winterburn & Co., 1874), 8.

Practitioners of medical topography sought to compare and rank the health of different locations and their inhabitants. It was a normative discourse that asserted the superiority of particular environments, and thus it was frequently intertwined with both nineteenth-century western boosterism and the ideology of agrarianism. The interest in medical topography arose from the desire of contemporaries to determine which areas of the state were suitable for settlement and which were not. Underlying their professional practices was the presumption that the health and success of human beings was dependent upon the landscape which they occupied. Individual lives were directly shaped by nature. In their minds, the study of human bodies was inseparable from the study of the environment itself. Thus, doctors in this period often doubled as meteorologists -- avidly collecting data on winds, rainfall, and temperature.<sup>36</sup>

As part of the wider interest in medical topography, the state medical establishment took a serious view of the problem of malaria in the Central Valley. While the State Board of Health did much to advertise the health benefits of the state's coastal areas and to encourage immigration, physicians quickly recognized that the Valley was the least healthy region of California and focused their efforts accordingly. From 1870 until the turn of the century, the reports of the State Board of Health as well as the

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<sup>36</sup> J.P. Widney, "Climatic Changes Which Man is Working in Southern California," *The Southern California Medical Practitioner* 1 (October 1886), 389-93. See also Henry Harris's description of the meteorological interests of Dr. Henry Gibbons, one of the era's most prominent physicians, in *California's Medical Story* (San Francisco: J.W. Stacey, 1932), 328. Dr. Thomas Logan collected the most extensive meteorological data for the city of Sacramento, which was used by contemporary engineers. See California Surveyor-General, *Annual Report 1861-62* (Sacramento, 1862).

transactions of the State Medical Society are filled with writings on malarial fevers. Writing in 1875, Dr. Thomas M. Logan, secretary of the State Board of Health and also a founding member of the state's first professional medical association, noted that malarial fevers were second only to consumption as a cause of death in California.<sup>37</sup> Moreover, although he noted that the entire state was "more or less subjected to" malaria, the majority of cases occurred in counties located in the Central Valley. As had been pointed out in the *Second Biennial Report*, "the broad level plains of the Sacramento and San Joaquin Valleys are specially proclivous to ague and other fevers...." The regions' major towns -- including Sacramento, Stockton, Fresno, and Bakersfield all suffered from a relatively high incidence of malaria. Marysville, a town in the Sacramento Valley and a center of gold-mining activity, had the highest mortality, a rate of 15% attributed to malaria alone.<sup>38</sup> Even booster literature occasionally noted that the Valley's environment might circumscribe the development of a civilized society, at least in certain localities.<sup>39</sup>

The discourse of medical topography, like that of agrarianism, was also deeply intertwined with contemporary understandings of race. The agrarian desire to make the valley a "white" space was underlain by an anxiety over whether, in fact, the valley was at

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<sup>37</sup> Logan, "Malarial Fevers and Consumption in California," in California State Board of Health, *Third Biennial Report, 1874-75* (Sacramento, 1875), 114.

<sup>38</sup> Statistics are, of course, unreliable. The very pervasiveness of malaria meant that it often went unreported. Moreover, not only was reporting poor and erratic, but diseases which we now understand as separate and distinct were, in the past, often lumped together. Typhoid, for instance, was often included in the same category. See Gray and Fontaine, "A History of Malaria in California," 26.

all suitable for white settlement. As one writer noted, "It is well known that some of the richest portions of the Great West are so fruitful of the causes of disease as almost to preclude settlement, especially by Americans...."<sup>39</sup> Most observers, both doctors and lay people, interpreted the different susceptibility of individuals to disease in racial terms. Each race, they believed, had evolved in a particular climate and remained particularly suited to that climate. As Thomas Logan argued, "The Fauna, Flora, and races of men have been created with different inherent adaptations for each particular climate. Transplanted to an uncongenial soil they do not flourish, but on their native grounds are strong and hardy."<sup>41</sup> Bodies, in this thinking, were emanations of their environment, and never fully separate from it. While bodies could not necessarily be successfully transplanted, their continued linkage with and dependence on the environment offered the hope, at least for some, that they might gradually adapt, or "acclimatize," to their new surroundings.<sup>42</sup>

Obviously disturbing to many Anglo immigrants was the relative immunity of the Chinese to malaria. Several contemporaries commented on the relative health of Chinese

<sup>39</sup> Titus Fey Cronise, *The Natural Wealth of California* (San Francisco: H.H. Bancroft and Co., 1868), 384-85.

<sup>40</sup> Benjamin C. Truman, *Semi-Tropical California* (San Francisco, 1874), 38.

<sup>41</sup> Thomas M. Logan, "Report of the Permanent Secretary of the Board," in California State Board of Health, *Third Biennial Report*, 28.

<sup>42</sup> For local belief in acclimatization, see *Settlers' Experience in Kern County*. On acclimatization and race, see Bolton, "The Health of the Country," 508-24. By the late 1860s, Thomas Logan, although a skeptic of racial acclimatization, was willing to admit the possibility of some acclimatizing, or at least health-giving, forces in California. See "Report on the Medical Topography and Epidemics of California," 549-50.

miners and farmers. As one white Californian remarked, "The Chinese seem to be constituted something like the negro; they are not affected by the malaria as the Anglo-Saxons are."<sup>43</sup> Their immunity suggested that they might be the race more naturally suited to their new home. It is perhaps this anxiety over Chinese immunity and white vulnerability that explains Thomas Logan's somewhat strained attempt to portray the white race as the most healthy in California. In a summary of his discussion of race and health for the State Board of Health, Logan wrote rather unequivocally that "the white race is thus by comparison [to Chinese, Native Americans, and African-Americans] demonstrated to have the least proportionate mortality, and consequently, to be the healthiest."<sup>44</sup> Logan suggested that the mortality of the Chinese from malaria had been underestimated -- when, in fact, most contemporary observations confirmed their immunity to the disease. Moreover, Logan pointed to the relative health and immunity of Native Americans -- even though most acknowledged the devastating effects of disease,

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<sup>43</sup> Congress, *Report of the Joint Special Committee to Investigate Chinese Immigration*, 44<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1877, S.R. 689, p. 78. Most Chinese immigrants to California came from South China where malaria had long been endemic; thus they had developed an immunity to the disease. For contemporary comments on immunity, see Brown, "The Malarial Fevers of the Sacramento and San Joaquin Valleys," 275. Harry Butler recalled the immunity of the Chinese fruit pickers in the valley. Harry E. Butler, "A History of the First Modern Mosquito Control Campaign in the United States, at Penryn, California, 1910," typescript, 15 April 1945, cited in David Vaught, *Cultivating California: Growers, Specialty Crops, and labor, 1875-1920* (Baltimore: Johns Hopkins University Press, 1999), 83.

<sup>44</sup> Logan, "Report of the Permanent Secretary of the Board," 29. A forthright expression of this concern came from Joseph Widney, the most prominent contemporary physician in Southern California, who wrote that "within the last decade the Anglo-Teuton has taken up his abode in a climate to which he has heretofore been a stranger....As a race we are entering into a climatic belt which to us is new and untried....What is to be the result?" J.P. Widney, "The Anglo-Teuton in a New Home," *The Southern California Practitioner* 1 (1886): 1-2.

including malaria, on Indians throughout California. His insistence on the health of Indians may well have reflected his desire to see the California landscape as inherently healthy and thus capable of producing healthy men.<sup>45</sup> But he was quick to add that Indian health was contingent on their not being "subjected to the habits of civilized life." Any attempt to "elevate" the Indians inevitably produced physical deterioration. Thus in Logan's mind it was only whites who could hope to benefit from *both* civilization and health in California.

It is worth reflecting on the cultural significance of "population" in light of medical topography's concern with race. As suggested earlier, concerns over the Central Valley's small population surfaced repeatedly in late nineteenth-century periodicals. Most obviously Anglo-Americans desired population growth because they believed it would further economic prosperity, both by creating more wealth and by providing additional markets. Furthermore, much of the impetus for immigration efforts came from regional capitalists who complained of the scarcity of labor and the resulting high wages, or alternatively from the railroads, who looked to immigration as a source of immediate revenues as well as for the potential to develop regional commerce with its attendant transportation needs. At the same time, those in rural areas looked to population growth to provide greater economic opportunities and social amenities.

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<sup>45</sup> This had been the rhetorical aim of Thomas Jefferson more than fifty years before. See Jefferson, *Notes on the State of Virginia* (1785; reprint, New York: Penguin, 1999), 61-79.

But population growth also had a larger cultural significance in that it was taken as evidence of racial success and prospects. Particularly in the period immediately following the Civil War, white Americans looked to census figures to confirm their own presumptions of biological superiority.<sup>46</sup> In the 1850s, a new emphasis on climatic racial determinism provided a scientific basis for long-standing concerns over the ability of immigrants to remain healthy in new environments.<sup>47</sup> Population growth took on added significance in the Western states and territories, regions with unfamiliar climates to which Anglo-Americans were newcomers. In an era in which climatic theories of evolution and environmental determinism were widespread, the adaptability of Anglo-Saxons to the Western states could not be assumed.<sup>48</sup> Thus, contemporaries looked to population growth as an indicator of the "health" of the race in a new place; numbers of

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<sup>46</sup> In particular, white Americans took the 1870 census, which showed a slowing of growth among African-Americans, as evidence that blacks were headed towards extinction in the United States— the result that many southerners had predicted as a result of emancipation. But to the dismay of many, the 1880 census showed that the African-American population had grown substantially faster than the white population. In retrospect, it became clear that African-Americans had been radically undercounted in 1870. George M. Fredrickson, *The Black Image in the White Mind: The Debate on Afro-American Character and Destiny, 1817-1914* (New York: Harper and Row, 1971), 246.

<sup>47</sup> Fredrickson, *The Black Image*; Reginald Horsman, *Race and Manifest Destiny: The Origins of American Racial Anglo-Saxonism* (Cambridge, MA: Harvard University Press, 1981); Bolton, "The Health of the Country," 508-24.

<sup>48</sup> See, for instance, J.P. Widney, "The Anglo-Teuton in a New Home." Although many people argued that the climate of the Valley could be improved by planting, cultivation, and other practices, the potential for ameliorating the climate did not erase existing doubts about the suitability of the climate for Anglos. On amelioration, see Kinney, *Eucalyptus*, H.S. Orme, "Irrigation and Forestry Considered in Connection with Malarial Diseases," California State Board of Health, *Tenth Biennial Report, 1886-88* (Sacramento, 1888), 224-27; Widney, "Climatic Changes which Man is Working."

bodies told an important story about the relationship between the local environment and the Anglo-American future.

The anxiety produced by environmental disease ran counter to the premises of agrarianism, which asserted that Anglo-American “civilization” would itself bring health to the land. Agrarian thinking presumed that Anglo culture could produce a better environment, conceived in aesthetic, economic, *and* bodily terms. Accordingly, nineteenth-century observers frequently expressed their optimism about the potential of the valley for American settlement, even while acknowledging the prevalence of disease. Typical of this early optimism, one observer during the Gold Rush period had suggested that:

When in the further development of this blessed country the miasmatic effluvia of the lowlands disappear..., there will be no land on earth that can compare with California in respect to its wonderful climate, [and] the excellent health of its inhabitants....<sup>49</sup>

Or, as a speaker before the State Agricultural Society noted, Anglo-American agriculture would inevitably improve the landscape as it had in England where intermittent fevers had disappeared “in consequence of the high cultivation and careful drainage of the

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<sup>49</sup> J. Praslow, *The State of California*, 60.

land.”<sup>50</sup> Moreover, observers were quick to note any signs that the environment had already improved as a result of Anglo emigration. For instance, concluding his discussion of the Valley’s poisonous north winds, Dr. J.H.C. Bonte observed that:

From all I can learn the north winds have lost much of their violence during the past twenty-five years. If so, we may assume that the development of the country has already begun to change the character of these winds.<sup>51</sup>

Elsewhere Will Green, the pre-eminent booster of the Sacramento Valley wrote, "Now since people begin to live a little more like white folks, they find [the region] is not so sickly as they were at first led to imagine."<sup>52</sup> Similarly, some writers noted that urbanization accompanied by appropriate sanitation seemed to decrease disease, and this, they argued was because cities and towns represented a more advanced stage of settlement.<sup>53</sup> Underlying all of these observations was the fervent belief that Anglo-American culture could not only affect but improve the physical qualities of the

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<sup>50</sup> E.R. Dille, "Annual Address Delivered before the Agricultural Society, August 30, Eighteen Hundred and Eighty-Three," *California State Agricultural Society, Transactions 1883* (Sacramento, 1883), 280. Remarks such as this implied that there was a long history of environmental "improvement" on the part of Anglos, of which California was merely one more challenge.

<sup>51</sup> Bonte, "The Northerly Winds," 213.

<sup>52</sup> Will S. Green, *The History of Colusa County, California and the General History of the State, with Supplement* (Sacramento: Sacramento Lithograph Co., 1950), p. viii. Originally this appeared in *Hutchings Illustrated California Magazine* 1 (April 1857).

<sup>53</sup> [Logan], "Report on the Medical Topography and Epidemics of California," 106.

landscape. Cultivation and settlement were steps in a larger process of biological and ecological evolution.<sup>54</sup>

Many contemporaries noted the positive role of trees and certain cultivation practices in improving the health of a region. Alfalfa, for instance, was widely regarded as anti-malarial. In the 1850s, consonant with his own distrust of careless intervention, Dr. Thomas Logan had suggested that the native riparian vegetation of the valley, the tules, had had some effect in preventing malaria.<sup>55</sup> But California settlers had never shown much appreciation for the tules, which were more frequently seen as a hindrance to travel and settlement. In the eyes of settlers, the tules were more typically assumed to produce disease and were consequently the first thing that needed to be cleared in order to produce the hoped-for agrarian landscape. Instead of retaining the valley's native vegetation, by the 1870s, Californians were particularly attracted to the use of eucalyptus as both an aesthetic and a prophylactic planting.<sup>56</sup> The Central Valley's lack of trees had always been off-putting to European settlers; thus, for many Californians, eucalyptus offered the potential for rapidly transforming the Central Valley into a suitable agrarian landscape, given its rapid growth rate and proclivity for the California climate.<sup>57</sup> Behind

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<sup>54</sup> The irony here, of course, was that it was Anglos that had brought malaria to California in the first place.

<sup>55</sup> [Logan], "Report on the Medical Topography and Epidemics of California," 108.

<sup>56</sup> Abbot Kinney, *Eucalyptus*, 24; Ian Tyrell, *True Gardens of the Gods: California-Australian Environmental Reform, 1860-1930* (Berkeley: University of California Press, 1999), 25.

<sup>57</sup> Richard Eigenheer, "Early Perceptions of Agricultural Resources in the Central Valley of California," Ph.D. diss. (U.C. Davis, 1976), 81-83; Lieutenant Charles Wilkes had made this observation in the 1840s. As he wrote in his report, "In 1847, when I spent eleven months on the California coast, it was universally

the promotion of eucalyptus lay the belief that Anglo-American aesthetics went hand-in-hand with health, and that once the landscape had been made more familiar it would perform be healthy. Abbot Kinney, the state's chief forester and the most avid promoter of the Australian tree, observed that:

The introduction of this tree has done more to change radically the appearance of wide ranges of country in California than any other one thing. In the reclamation of many arid plains of the central and southern parts of California the blue gum has worked almost like magic. It modifies the winds, breaks the lines of view all so quickly that one can scarcely realize that a valley of clustered woods and lies of trees was but a year or two before a brown parched expanse of shadeless summer dust.<sup>58</sup>

Relying on reports from Italy where eucalyptus was believed to have controlled miasma in the Campagna region, several Californians sought to introduce eucalyptus into the Central Valley. Its efficacy against malaria was widely accepted, although the reasons for this varied. Among the multiple explanations offered for its prophylactic powers were its aroma and ability to "purify" the air, its ability to protect the soil against the action of the

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believed that but a small part of the soil would produce crops. 'There are no trees on these great plains,' said every body; 'and if a tree will not grow, of course, the soil must be sterile.'" Charles Wilkes, *Narrative of the United States Exploring Expedition During the Years 1838, 1839, 1840, 1841, 1842*, vol. 5 (Philadelphia, 1845), 193, cited in Kenneth Thompson, "The Perception of the Agricultural Environment," *Agricultural History* 49 (October 1975), 233-34.

<sup>58</sup> Kinney, *Eucalyptus*, 24.

sun, and its absorption of water and humidity.<sup>59</sup> In 1874, one Valley newspaper confidently predicted that the continued cultivation of the area combined with the planting of *Eucalypti* would soon eliminate any trace of malarial disease.<sup>60</sup>

The agrarian narrative of settlement and improvement existed uneasily alongside the environmentally determinist narrative of disease. The agrarian narrative, in its most optimistic variants, presumed that Anglo-American settlement was not limited by the environment -- but, to the contrary, that the health and productivity of the landscape might only be limited by the quality and industry of those who occupied it. Such thinking meshed nicely with ideas of manifest destiny. In the far western lands, the reordering of the environment would bring not only a democratic culture, but also healthy land and healthy citizens.

Yet while the intellectual correlation between civilization and health was easily made, it was considerably more difficult to realize on land. From the outset, the California landscape had not behaved in predictable ways. In the East, while malaria had accompanied the settlement of several areas, the mechanism for this development, as contemporaries usually understood it, was the felling of trees and consequent exposure of

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<sup>59</sup> Orme, "Irrigation and Forestry Considered in Connection with Malarial Diseases," 226-27; [Logan], "Report on the Medical Topography," 106-107; Logan, "Malarial Fevers and Consumption in California," 130-35. In fact, eucalyptus, because of its water requirements, undoubtedly helped to eliminate mosquito habitat.

<sup>60</sup> *Bakersfield (California) Kern County Weekly Courier*, 6 June 1874.

the soil, which yielded an unprotected humid surface, ripe for the production of miasma.<sup>61</sup> Clearing not followed immediately by cultivation was presumed to be deleterious, which was consistent with the notion of agrarian finishing.<sup>62</sup> But in California something quite different had occurred. American settlers had encountered a region that was relatively treeless to begin with. And the unprotected surface had been, in the words of the secretary of the Board of Health, “rendered moist and malarious” as a result of efforts to mine and cultivate the land.<sup>63</sup> Rather than improving the land, cultivation of the Central Valley frequently seemed to render the region only more unhealthy. As one physician noted, “there seems to be an apparent lack of regularity in the action of certain well established laws....”<sup>64</sup>

The concern that settlement and cultivation might actually degrade the landscape emerged most strongly in the 1870s and 80s as Californians began to debate the introduction of irrigation on a large scale. The potential of irrigated agriculture was

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<sup>61</sup> See, for instance, Logan, “Malarial Fevers and Consumption in California,” 129.

<sup>62</sup> As early as 1775 the noted physician Benjamin Rush had observed a difference between clearing and cultivating that was repeatedly confirmed by other observers: “I beg a distinction to be made here between *clearing* and *cultivating* a country. While clearing a country makes it sickly,...*cultivating* a country, that is draining swamps, destroying weeds, burning brush, and exhaling the wholesome and superfluous moisture of the earth, by means of frequent crops of grain, grasses and vegetables of all kinds, render it healthy.” Rush, “An Inquiry into the Causes of the Increase of Bilious and Intermitting Fevers in Pennsylvania,” *Medical Inquiries and Observations*, vol. 2 (Philadelphia, 1797), quoted in Ackerknecht, “Malaria in the Upper Mississippi Valley,” 75.

<sup>63</sup> [Logan], “Report on the Medical Topography and Epidemics of California,” 93.

<sup>64</sup> J.P. Widney, “Irrigation and Drainage,” California State Board of Health, *Sixth Biennial Report, 1882-83* (Sacramento, 1883), 104. Also a report appearing in the journal of the American Medical Association noted that forms of malaria occurred in “localities where it might be rationally inferred that they would be

discussed and debated at great length in nineteenth-century California. Even as farmers suffered through frequent droughts and dry years, many California farmers remained skeptical about the benefits of irrigation throughout the 1880s.<sup>65</sup> As engineer James Schuyler reported when surveying irrigation works in Yolo County in 1871:

I found throughout the section visited a general prejudice against the irrigation of grain. Those who had tried it found the soil was too stiff, and where irrigated in the spring time the land became baked and soured....<sup>66</sup>

Similarly, writing of irrigation in San Joaquin County, engineer Carl Grunsky wrote that:

It is generally thought that, although good crops of grain were harvested where irrigation was practiced, the land was not benefitted thereby and required a number of years to recuperate from the effects of irrigation.<sup>67</sup>

But the most serious criticism of irrigation was its effect on health. Beginning in the 1850s and continuing until the turn of the century, several observers and residents of

least likely to present themselves." See "Report on Medical Topography and Epidemics of California," *Transactions of the American Medical Association* 16 (1865), 547.

<sup>65</sup> *Pacific Rural Press*, 27 January 1872, p. 56. For a discussion of the ambivalent attitudes towards irrigation in this period, see Donald J. Pisani, *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West* (Berkeley: University of California Press, 1984), 54-77.

<sup>66</sup> J.D. Schuyler, "Report on the Works and Practice of Irrigation in Yolo County," n.d., p. 23, box 6/71, State Engineer -- William Hammond Hall Papers, Acc. 91-06-10, California State Archives, Sacramento, California.

the Central Valley noted that the introduction of irrigation water was frequently correlated with an increase in disease. In discussions of irrigation and health, as in discussions of medical topography, concerns over bodies and environment intersect one another. Yet in this case, the concern was not with the environment's inherent characteristics, but with the seemingly negative effects of human alterations of that landscape. The concern over the ill effects of irrigation was not, however, limited to California. Many professionals were aware of the link between irrigation and disease in Italy and India, as well as the increase in disease that rice production had brought to the southern U.S. In a widely cited treatise on disease in the Mississippi Valley published in 1857, the physician Daniel Drake had noted the ambivalent effect of surface water on regional sickness. Drake had concluded that water was a "necessary element" in the production of miasmas, but he also acknowledged that the observations of others who argued that water seemed, in some cases, to absorb noxious gases and render certain localities more healthy.<sup>68</sup> Nonetheless, the established association between water and disease raised concerns that irrigation could, in fact, increase the prevalence of miasma. But it was only in the settlement of the arid regions of the Far West that Americans began to encounter first hand the association between irrigation and disease.

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<sup>67</sup> [C.E. Grunsky], "Irrigation -- San Joaquin County," [1880s], p. 30, box 6/68, State Engineer--William Hammond Hall Papers, Acc. 91-06-10, California State Archives. For a similar assessment, see also *Pacific Rural Press*, 14 October 1871, p. 227.

<sup>68</sup> Drake, *Systematic Treatise*, in *Physician to the West*, ed. Shapiro and Miller, 361.

The earliest and strongest statement concerning the ill effects of irrigation in California came from Dr. Thomas Logan. Writing in 1859, just two years after Drake's study of the Mississippi Valley was published, Logan described the ill effects of irrigation on the Central Valley environment:

Prior to 1858 the plains as well as the mountains of California were proverbial for their salubrity. With the exception of the irregular development of confused forms of fever in towns and isolated localities, chiefly where stagnant water exists, and of intermittents in the neighborhood of exposed river-courses, and low places, which are inundated during the greatest part of the year, endemic diseases have been comparatively unknown, at least since the introduction of the comforts and ameliorations of civilized life. But, how stands the case now? An extensive system of irrigation for mining and agricultural purposes has been resorted to—canals seven thousand miles in aggregate length have been dug to lead the water in innumerable serpentine courses from the rivers into the placers, and almost every valley that can be dammed on the line of these ditches has been appropriated as reservoirs to hold water. The action of an almost tropical sun upon the decaying vegetable matter that remains in these canals and reservoirs, when they have been drained...has been manifested in its effects. Not only in the plains and agricultural regions, but along the whole range of the foot-hills...nothing but fever at one time was heard of....<sup>69</sup>

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<sup>69</sup> [Logan], "Report on the Medical Topography and Epidemics of California," 94-95.

This quote reflects Logan's somewhat convoluted attempt both to justify white settlement and to condemn the methods of that settlement by appealing to the natural environment. He paradoxically invokes two contradictory discourses about the landscape. On the one hand, Logan gestured to the discourse of agrarian improvement when he stated that endemic diseases in the region had been unknown since the introduction of "civilized life." Yet in the next sentence, he derides the unnatural reworking of the landscape that had, in his estimation, led to fever and disease. While Logan undoubtedly exaggerated the "salubrity" of the region in the pre-mining era (malaria had, after all, decimated Indian populations in the early 1830s), he had observed a tremendous exacerbation of disease in the 1850s. However much Logan might want to believe that civilization brought health to the land, he was forced to recognize that the California experience with mining and irrigation was suggesting otherwise.

Logan's concerns were reiterated by many farmers living within the Valley who had experienced first-hand the effects of irrigation. For instance, in 1871, the *Pacific Rural Press* commented that the most serious objections to irrigation were its expense and "the sickness that may be induced."<sup>70</sup> Echoing this concern, in 1879 farmer J.J. Doyle told an agent of the State Engineer's office that irrigation produced malaria and "light fevers." Another farmer confirmed this view, reporting that the county had become more subject to fever and ague after the introduction of irrigation. Yet even while

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<sup>70</sup>*Pacific Rural Press* 14 October 1871, p. 227; also *Pacific Rural Press*, 24 June 1871.

acknowledging the association between irrigation and disease, these farmers also noted the necessity of irrigation in the Valley, implicitly accepting disease as a necessary risk.<sup>71</sup>

Engineers were also well aware of the link between irrigation and disease. For instance, P.J. Flynn one of the foremost California engineers of the period and author of a text on irrigation, cited a British authority who explicitly linked irrigated agriculture and malaria and who even suggested that the benefits of irrigation were often outweighed by its negative effect on health:

It is notorious that wherever irrigation is carried on, cruel malarious diseases as surely follow, and...it is very questionable whether the aggregate increased mortality in a number of years, due to irrigation, does not even exceed what that of a periodic famine would be.<sup>72</sup>

With respect to California, engineers had direct experience with the problem of disease in the valley. In the first official engineering study of the potential for irrigation in the valley, conducted under the auspices of the U.S. Army Corps of Engineers, the authors noted the problem of irrigation-induced disease.<sup>73</sup> By the mid-1870s it was

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<sup>71</sup>A.J. Warfield, Field Notes, June-July 1879, book 39, p. 49, box 20, State Engineer – William Hammond Hall Papers, Acc. 94-07-04, California State Archives; A.J. Warfield, Field Notes, Feb-March 1879, book 38, p. 11, *ibid*.

<sup>72</sup> Cited in P.J. Flynn, *Irrigation Canals and Other Irrigation Works, Including the Flow of Water in Irrigation Canals and Open and Closed Channels Generally* (San Francisco: George Spaulding and Co., 1892), 335.

<sup>73</sup> "Rice cultivation is too well known to be productive of miasmatic diseases...to deserve more than a reference here...but there is a danger that [irrigated] wheatfields may prove no mean rivals of rice-fields in

widely known among engineers that disease had become much more prevalent in the region of Fresno coincident with the widespread introduction of irrigation.<sup>74</sup> Engineer James Schuyler had also noted the observations of settlers in Yolo County who claimed that, "Wherever tried the irrigation of grain produced an ill effect upon the climate, causing malarial fevers, etc."<sup>75</sup>

As these accounts suggest, the problem of miasma called both irrigation and the agrarian vision of the Central Valley into question. Agrarianism was an eighteenth-century rationalist vision that was colliding with nineteenth-century experience in California and other western spaces. By the mid-nineteenth century, the conditions of the far western environment were raising serious questions about the possibilities of agricultural settlement. In the Central Valley, aridity threatened the expansion of white settlement; yet the solution to aridity -- irrigation -- threatened to make the region only more unhealthy and thus unfit for settlement. In either case, the potential of the valley would be limited, directly or indirectly, by its inherent environmental characteristics.

Despite the challenges raised by irrigation and disease, Californians would not easily abandon their agrarian visions. Although the correlation between irrigation and

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unhealthfulness." Congress, House, *Report of the Commissioners on the Irrigation of the San Joaquin, Tulare, and Sacramento Valleys, in the State of California*, 43<sup>rd</sup> Cong., 1<sup>st</sup> sess., 1874, H.E.D. 290, p. 7.

<sup>74</sup> See, for instance, the statement of George Manuel who refers to a commission of British engineers who visited Fresno in 1873 and interviewed the residents there about the impacts of irrigation on health. U.S. Congress, Senate, *Report of the Special Committee of the U.S. Senate on the Irrigation and Reclamation of Arid Lands*, part 2 (The Great Basin Region and California), 51st Cong., 1st sess., 1890, S.R. 928, p. 229.

<sup>75</sup> Schuyler, "Report on the Works and Practice of Irrigation in Yolo County," 23.

disease was widely acknowledged, by the 1880s Californians were recognizing the necessity of irrigation for successful agriculture throughout much of the state. Moreover, promoters of the state's interior regions were unwilling to have the region labeled "unhealthy."<sup>76</sup> Clearly regional boosters had good reason to minimize the presence and effect of malaria and disease in the valleys, and this would continue well into the twentieth century.<sup>77</sup> Often times, individuals engaged in outright denial, particularly when profits were directly at stake.<sup>78</sup> Others challenged the medical link between landscape and bodies. As one critic of the miasma theory suggested, part of the problem might instead be inaccurate diagnoses and the quality of local medical practitioners. He bemoaned:

The injury that the physicians of California are doing in making careless diagnoses. It is retarding immigration into the interior of the State—in the

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<sup>76</sup> Statements of George Manuel, L.M. Holt, E.B. Perrin, and Tipton Lindsay, in Senate, *Report of the Special Committee...on the Irrigation and Reclamation*, pp. 229, 231-32, 235, 281.

<sup>77</sup>Remarks by Stanley B. Freeborn in *Proceedings and Papers of The Sixth Annual Conference of Mosquito Abatement Officials in California* (10 December 1935), 1.

<sup>78</sup> For instance, in a pamphlet issued by the Sacramento Valley Reclamation Company, a speculative land venture in the Sacramento Valley, the following appeared: "Those who have resided for years in the immediate vicinity of the lands have enjoyed such good health that it may be safely said that the country is free from malarious diseases. The strong winds which so generally prevail on the Bay of San Francisco and its borders become pleasant by the time they reach the region in which this tract lies, and hence it is that in regard to climate and its influence on health it is classed with Los Angeles and Tulare counties, and equally favorable as a residence for those affected with lung or throat diseases, asthma, rheumatism, etc." Sacramento Valley Reclamation Company, *Tule Lands of the Sacramento Valley in Yolo and Colusa Counties, California* (Louisville: John P. Morton and Co., 1872), 8. See also Justus H. Rogers, *Colusa County, Its History Traced From a State of Nature Through the Early Period of Settlement and Development, to the Present Day* (Orland, CA: 1891).

San Joaquin valley. Many people would locate there, but they have heard that it is full of malaria, and they keep from settling there. I deplore this fact. This practice should be stopped....<sup>79</sup>

While most people were willing to concede the presence of miasma and malarial disease, many emphasized its mild form and the ability of immigrants to acclimatize quickly.<sup>80</sup> Others struggled to find explanations other than irrigation that would at least localize the problem, or, alternatively, to suggest prophylactic measures that might reduce the presence of disease without interfering with irrigated agriculture. One of the most commonly held alternative theories was that disease came not from miasmatic vapors but from the water which people drank, and not from all water but only from particular wells. Will Green, the Sacramento Valley's most influential booster in this period, made this argument before the State Irrigation Convention in 1884:

I began to notice that those people who built their houses and *dug their wells* on a newer [soil] formation generally had chills, while the others, as a rule, had none. Sometimes these sickly and healthy places would be but

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<sup>79</sup> Brown, "The Malarial Fevers of the Sacramento and San Joaquin Valleys," 280. See also *Bakersfield (California) Kern County Weekly Courier*, 6 June 1874.

<sup>80</sup> One San Joaquin valley newspaper described the mildness of the disease this way: "It is a rare occurrence for patients to be confined to the house more than a day or two, and at present we know of three such instances, neither of which is considered in the least dangerous. After acclimating, health is almost uniformly good...." *Bakersfield (California) Kern County Weekly Courier*, 27 July 1872.

a few feet apart. They all breathed the same air, but they *did not drink the same water*.<sup>81</sup>

Green went on to describe how the county hospital had been located on a new soil formation, with the result that both patients and doctors suffered from chills for several years until the physician in charge had the hospital connected to the town waterworks. According to Green there was an “immediate” change, and subsequently the hospital was free from chills and fever.

In Green’s interpretation, the source of disease was not the landscape generally, but particular points that could be identified and isolated. If disease emanated only from certain wells, the solution was simply to locate wells carefully, or to lay pipes to the river. It was a question of intelligent settlement. If disease could be localized, it could also be avoided. The rest of the landscape remained untainted, and available for use. While the health of human bodies was still linked to the landscape, the link was not so tight or all-encompassing.

But it was not only boosters who struggled to localize disease. Nineteenth-century sanitarians and public health experts often ascribed disease to moral failings and social standing. In such cases the desire to control disease mapped conveniently onto the desire to control and proscribe the actions of certain groups of people. Typical of this approach was H.S. Orme, President of the State Board of Health in the early 1880s, who

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<sup>81</sup> Cited in H.S. Orme, “Irrigation: Its Influence on Health, Etc.,” California State Board of Health, *Eighth*

while admitting the environmental sources of miasma, still sought to blame disease on individuals:

In many instances, where diseases are attributed to malarial influences, I am convinced that the true source of the evil lies in the habits of the people and the disregard of sanitary laws. Improper food and clothing, reckless exposure, the use of surface water for drinking purposes, and, above all, personal uncleanliness, will engender diseases closely allied to those produced by malaria, and these conditions are too often to be found among the lower classes of our people.<sup>82</sup>

Orme both acknowledged the presence of environmental disease, and at the same time, displaced the dangers of the environment onto individuals themselves. Recognizing the problems posed by the California environment, he expressed both the hope that the land would respond to settlement by the right kind of people and the anxiety that it was not.

That malaria was still a problem in the 1880s had suggested to contemporaries that white settlement, in and of itself, would not cure the problem. After three decades of white settlement disease in the valley remained a serious problem and in some areas it had grown worse. Yet unwilling to abandon their agrarian vision of the valley, many professionals sought more involved explanations for disease and alternative solutions. Orme suggested that sanitation and reform offered a possible, and palatable, cure.

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*Biennial Report, 1882-83* (Sacramento, 1884), 52.

<sup>82</sup> H.S. Orme, "Irrigation and Forestry Considered in Connection with Malarial Diseases," 224.

Chester Rowell, a doctor but also a leading booster of the San Joaquin Valley town of Fresno, similarly defended the agrarian viability of the local landscape:

Irrigation, of itself, need not and does not make a sickly country. Irrigation on a large scale, where water is used to such an extent as to saturate and fill up the soil, and continued during the Summer months, will produce a general *malarial* influence....This malarial influence is but a small factor among the causes of disease...Most of the causes of sickness in an irrigated country are visible and can be overcome, and the tendency to sickness decreases as the settlements grow older. Among causes are: Impure water, excessive and indiscreet drinking of water, [and] careless use of fruits....<sup>83</sup>

Here Rowell exonerated both settlement and irrigation. In his explanation, settlement decreased the prevalence of disease; meanwhile he attributed existing disease both to very localized sources and to personal behavior. Like Orme, he sought to individualize the problem. White settlement *did* improve, or at least did not degrade, the landscape. The fact that sickness remained needed to be understood as a problem of individual behavior: "excessive and indiscreet drinking of water," "careless use of fruits."

It is possible, of course, to argue that conceptions of disease in the Central Valley and elsewhere were driven by material needs and desires and that ultimately it was capitalism that shaped understandings not only of the environment but also of human

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<sup>83</sup> Orme, "Irrigation -- Its Influence Upon Health, Etc.," 59.

bodies. By helping to sever the connections between landscape and human health, both proto-germ and social theories that personalized disease arguably freed individuals to approach the environment as an ever more abstract commodity, dissociated from themselves and their own well being. But such an interpretation oversimplifies the struggles of nineteenth-century individuals to understand the functioning and vulnerability of their own bodies in unfamiliar landscapes. Although capitalism may have created the desire for irrigation, it alone does not explain the cultural understandings of landscape and disease. Even while land and water were increasingly seen as abstract commodities subject to market exchange, individuals nonetheless understood their environment in terms that were, at one level, corporeal. The vulnerability of the material human body ensured that the environment could not be rendered wholly abstract. Pieces of land and sources of water were not simply interchangeable. Some caused sickness, while others did not. In other words, the commodification of the environment was always potentially contested by bodies that fell ill.<sup>84</sup>

Indicative of the growing concern over irrigation and health, in 1884 the California State Board of Health devoted several pages of its *Biennial Report* to an essay by Dr. Orme on the subject. Noting the contradictory nature of the evidence, Orme

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<sup>84</sup> As Margaret Jane Radin has argued in a different context, “The traditional liberal view [which requires that we rigidly separate market and nonmarket activities] prevents us from appreciating the nonmarket aspects of many of our market relations; it prevents us from seeing fragments of a nonmarket order latent in the market society.” Radin, *Contested Commodification* (Cambridge, MA: Harvard University Press, 1996), 30.

pointed to the need to discriminate among particular soil types and localities. Some irrigated areas had definitely shown an increase in disease, while others had no malaria whatsoever. He quoted anecdotal evidence from a number of persons with experience in the valleys, primarily physicians and other local elites.<sup>85</sup> Most of the writers in Orme's report, however, minimize the seriousness of malaria, and are particularly reluctant to indict irrigation wholesale, and this seems representative of the broader response of Californians to the issue. Many admitted that irrigation might be a partial cause of regional sickness; however, they were quick to point out mitigating factors, such as winds or plantings that might compensate for the ill effects of irrigation on the region's health.

Despite such attempts to limit and confine disease, both practically and rhetorically, the problems wrought by irrigation had unraveled the simple correlation between civilization and health in California. Settlement and improvement of the landscape was often yielding quite disastrous results. Late nineteenth-century individuals remained quite conscious of their vulnerability to the landscape. At a local scale, people harbored serious questions about the tractability of the land and the impact of agriculture. Anglo-American agriculture -- particularly irrigated agriculture -- was not simply a means of controlling and shaping the landscape for utilitarian purposes, but an unpredictable gamble.

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<sup>85</sup> Orme, "Irrigation -- Its Influence on Health, Etc.," 51-59.

One way in which individuals sought to assure themselves of the propriety of environmental transformation was by asserting that their efforts were aimed at mimicking nature. As the discourse of agrarian finishing implied, human interventions in the natural world were meant merely to further, rather than to radically alter, a larger natural design. To the extent that human actions mimicked or extended natural processes, they were more easily deemed appropriate. Particularly for those who worked closely with the land, and who struggled to make the valley into an agricultural landscape, the symbiosis of human actions with nature was always a concern. This was partially an outgrowth of physiocratic thinking -- if nature was the source of wealth, human beings always existed in a subordinate position and were bound to respect larger natural patterns. If the land were treated improperly, it could not be expected to yield good crops of wheat, oranges, or grapes. And if the land failed to yield good crops, civilization would not flourish.

At an intimate level, most farmers realized that the landscape did not straightforwardly authorize or acquiesce in their projects.<sup>86</sup> What frustrated and confounded early settlers in the Central Valley was the natural fluidity of the landscape. Subject to regular seasonal floods as well as periodic high floods in early summer, the valley landscape was continually reworked by the water moving through it. The periodic floods of the Sacramento and San Joaquin rivers inevitably cut new channels and sloughs and caused streams and creeks to change their course. Such rearrangements made it

difficult to delineate the precise features of the landscape and to ascertain which were "natural" and which were human creations. In his description of the Fresno region for the State Engineer's Department, engineer Carl Grunsky presented an environmental history that acknowledged the intermingling of human labor and natural processes:

The freshets of 1861-62 cut a new channel from a point on the Kaweah River about 14 miles east of Visalia in a northwesterly direction....Ship Cut and a section of Canoe Creek were enlarged by the flood waters and became a part of this new channel, and finally a connection was established with the Cross Creek channel below Visalia, and thus St. Johns Channel...was permanently established. At the same time a new high-water channel was washed out towards the northeast....the same high waters caused so much erosion in Lander's Ditch that it became a branch of the river...."<sup>87</sup>

As Grunsky indicates, irrigation ditches often became rivers, while old river channels ran dry or changed their course. Moreover, every alteration was subject to further alteration in the next high water.

Where possible settlers sought to capitalize on natural changes, using newly established sloughs and channels to expand and elaborate their irrigation systems. The

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<sup>86</sup> Mark Fiege also makes this point in his study of central Idaho. See Fiege, *Irrigated Eden: The Making of an Agricultural Landscape in the American West* (Seattle: University of Washington, 1999), 11-41.

<sup>87</sup> C.E. Grunsky, *Irrigation Near Fresno, California*. U.S. Geological Survey, Water-Supply and Irrigation Papers, No. 18 (Washington D.C., 1898), 12.

use of sloughs and channels as irrigation canals and drainage ditches was a common practice throughout the valley.<sup>88</sup> And thus when settlers built their own canals, it was not so much a wholesale reorganization of the landscape as it was a utilization of its natural patterns. As both natural processes and human beings remade the landscape over time, it became nearly impossible in many places to disentangle the human from the natural.<sup>89</sup> Settlers as well as engineers implicitly recognized the hybridity of the landscape they occupied, an understanding that was embedded in the notion of "finishing" from the start. Accordingly, the finished landscape was less a symbol of conquest and domination than a sign of the synergism, in the most literal sense, between Anglo-Americans and the environment.

The desire to rework the landscape along mimetic lines is perhaps one of the more surprising things that emerges from nineteenth-century sources. After all, to compare the modern Central Valley with that of the early nineteenth century does not suggest that the desire for mimesis has been particularly well carried out. Moreover, we are accustomed to thinking of human-nature interactions in this period in oppositional terms, as a process

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<sup>88</sup> Grunsky, *Irrigation Near Fresno*, 17, 61, 75.

<sup>89</sup> As one member of the State Engineer's Office wrote, "The swamp lands were to a great extent reclaimed by the natural changes in the water courses. Other floods wrought other changes and in later years human energy has been a potent agency in establishing the flow of the river's water as it exists at the present time." "Kaweah River District," box 1/15, State Engineering Department -- William Hammond Hall Papers, Acc 91-06-01, CSA.

of conquest, particularly in the American West.<sup>90</sup> Yet the desire for environmental conquest was more likely to find expression in literary and political rhetoric than in the more prosaic materials that circulated within the valley itself. As Mark Fiege has argued in his environmental history of central Idaho, the narrative of conquest itself requires some revision.<sup>91</sup>

In fact, farmers and agricultural writers in California repeatedly looked to nature for authorization. The State Agricultural Society explained that it had followed "the dictates and suggestions of nature" in fixing regional boundaries.<sup>92</sup> Similarly, agricultural publications typically advised their readers to heed nature more closely in order to obtain better yields. One writer in the *Pacific Rural Press*, commenting upon irrigation, recommended that since nature in California did "most all of her irrigation in the winter or cool season of the year," that this was the most auspicious time for artificial irrigation as well. As the writer explained, "nature, as a general rule, is the best teacher."<sup>93</sup> Similarly, California fruit growers were among the strongest advocates of "biological" pest control. Believing that God had appointed a parasite to control each insect, they

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<sup>90</sup> On conquest see Patricia Nelson Limerick, *The Legacy of Conquest: The Unbroken Past of the American West* (New York: Norton, 1987), and more recently, Frieda Knobloch, *The Culture of Wilderness: Agriculture as Colonization in the American West* (Chapel Hill: University of North Carolina, 1996).

<sup>91</sup> Fiege, *Irrigated Eden*, 207-208.

<sup>92</sup> California State Agricultural Society, *Transactions 1880* (Sacramento, 1881), 267.

<sup>93</sup> *Pacific Rural Press*, 10 June 1871.

insisted that fruit growers need to look for "natural remed[ies]" to their insect problems.<sup>94</sup> As one fruit grower told his colleagues amidst a debated over how to respond to a serious pest invasion, "Nothing is left to man but to imitate nature, and, getting hold of those insects that prey upon other insects, hurl them against the marauders that infest his land."<sup>95</sup>

But it was not only farmers and lay people that advocated an environmental practice that adhered to nature; it was also scientific professionals, those most typically associated with ideologies of abstraction and rationalization that presuppose a separation between human beings and the natural world. In nineteenth-century California, doctors and engineers, while committed to a professional practice that valued such abstract knowledge, still operated within a cultural discourse that stressed the interaction between human beings and nature and the need for individuals to respect natural patterns.

As a group, California physicians were those most committed to natural mimetic practices, and this contributed to their professional skepticism and concern about the environmental transformations that Californians were undertaking.<sup>96</sup> Medical writings of the period indicate an ongoing and serious concern not only with the existence of malaria,

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<sup>94</sup> California State Board of Horticulture, *Third Biennial Report*, 186. On the cultural sources of California's biological control effort, see Tyrell, *True Gardens of the Gods*, 174-89.

<sup>95</sup> California State Board of Horticulture, *Report 1881-82* (Sacramento, 1882), 25.

<sup>96</sup> There were, of course, exceptions to this generalization, particularly among those physicians who practiced in the small agricultural towns of the Central Valley. The most notable is Chester Rowell of Fresno, cited above, in Orme, "Irrigation -- Its Influence Upon Health, Etc."

but with the human health impacts of all environmental transformations. In their thinking, any environmental change might potentially be registered in terms of increased disease. Dr. William Gibbons, for instance, argued in 1875 that the extension of irrigation in the Central Valley would inevitably result in “the formation of a larger area within which malarial fever would prevail....”<sup>97</sup> Gibbons was but one of many physicians who counseled caution with respect to irrigation. Thomas Logan explicitly linked the recurrence of fever in the Sacramento Valley with human-induced changes in the land. Lamenting deforestation, the effects of mine spoils on the rivers, and the impact of irrigation, Logan forecast that Californians would eventually have to bear the results of an “outraged nature.” As he put it,

In no other country or epoch in the world’s history than in California at the present time has man’s action ever been known to change so rapidly or so permanently the face of nature....Unless, therefore, some effort is made towards correcting and providing against the evils resulting...the most valuable portion of California will become more and more obnoxious to the health of the inhabitants during the autumnal months.<sup>98</sup>

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<sup>97</sup> W.P. Gibbons, “On Forest Culture as a Prophylactic to Miasmatic Diseases,” in California State Board of Health, *Third Biennial Report*, 53.

<sup>98</sup> Logan, “Malarial Fevers and Consumption,” 118.

Pointing not only to the rapidity of the environmental changes that Californians were undertaking, but also their "permanence," Logan insisted that human interventions in the landscape had far exceeded anything that mimesis might suggest.

Another physician, M.M. Chipman, pointed out the deleterious effects of mining debris, which had clogged the Sacramento River and ruined farm land throughout the lower Sacramento Valley.<sup>99</sup> The effects of these environmental changes were not simply economic or social, but also medical. As Chipman explained, the deposits increased the extent and frequency of malaria, and many local physicians claimed that the deposits themselves engendered typhoid-like diseases that were more severe and less treatable than diseases experienced previously. Like Logan, Chipman criticized Californians for failing to follow natural dictates, and he urged them to "array yourself in support of the beneficent processes of nature, and to discountenance this ruthless war against her sacred works."<sup>100</sup> All of these physicians linked environmental destruction to declines in health. Their hesitant attitude towards environmental intervention reflected their belief that the human and the non-human worlds were closely intertwined, and that poorly conceived alterations would have negative bodily effects.

Interestingly, the attitude of physicians such as Logan and Chipman toward the landscape paralleled their attitude towards medical practice, mirroring the turn towards

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<sup>99</sup> This story is told fully in Robert Kelley, *Gold vs. Grain: California's Hydraulic Mining Controversy* (Glendale: Arthur H. Clark and Co., 1959).

less intrusive practices in mid-century therapeutics that has been chronicled by historian John Harley Warner. Historians have long characterized much early nineteenth-century medical practice as both "rationalist" and "heroic." By rationalism, historians of medicine refer to the reliance on treatments that were based primarily on abstract medical principles rather than on empirical results. "Heroic" medicine, on the other hand, refers to forceful therapeutics characterized by the use of strong drugs and certain invasive practices such as bleeding. For much of the nineteenth century, diseases were perceived as either over-stimulating or depleting – in either case, the physician's job was to bring the body back to an equilibrium state. But by the last third of the century, many physicians had adopted what Warner characterizes as an "anti-heroic" stance. Instead of emphasizing the need to apply force to the body, the younger, more empirically minded physicians advocated both less aggressive treatments and greater attention to the effect of local environmental conditions on bodily health. Attacking their predecessors for what they regarded as routine, mechanical, and often dangerous practice, they argued that intervention should be undertaken only after a careful diagnosis and that it had to be directed at specific physiological processes rather than toward changing the general equilibrium of the entire body.<sup>101</sup>

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<sup>100</sup> M.M. Chipman "Report of the Committee on Medical Topography, Endemics, Etc.," *California Medical Society, Transactions, 1880-81*, (Sacramento, 1881), 128-51, quote on 151.

<sup>101</sup> John Harley Warner suggests as well that the division between empiricists and rationalists in the medical profession was, in part, a generational, as well as a regional, issue. Those who came of age in the first half of the nineteenth century and fought to overturn the rationalist systems of Benjamin Rush and others were

More specifically, many mid nineteenth-century physicians argued that their profession needed to pay closer attention to “nature” and that the well-being of the body depended upon recognizing “the role of nature in healing disease and the limits of medical art.”<sup>102</sup> In other words, the need to follow natural processes applied as much to the human body as to the environment. In their own practice, California’s leading physicians embraced this attitude of natural mimesis whole-heartedly. As one doctor reminded his colleagues in the Sacramento Society for Medical Improvement, the physician was merely “the assistant of nature.” Another doctor remarked that, “As a profession we give too much medicine and rely too little upon the great natural forces which are constantly at work in organic life.”<sup>103</sup> California physicians repeatedly argued that their experience with diseases conditioned by a novel climate dictated the use of natural methods and the rejection of what Thomas Logan labeled “preconceived opinions and stereotyped modes of practice.” Instead Logan advised his colleagues to rely on

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less likely to take to the “new” rationalism, founded on laboratory science, that gained ground in the last third of the century. *The Therapeutic Perspective: Medical Practice, Knowledge, and Identity in America, 1820-1885* (Cambridge, MA: Harvard University Press, 1986), 79, 83-102; [Logan], “Report on Medical Topography,” 123.

<sup>102</sup> Dr. Jacob Bigelow, quoted in John H. Warner, “The Nature-Trusting Heresy” American Physicians and the Concept of the Healing Power of Nature in the 1850s and 1860s,” *Perspectives in American History* 11 (1977-78), 295-96.

<sup>103</sup> Sacramento Society for Medical Improvement, “Minutes,” vol. 1, pp. 36-38, 21 July 1868, California State Library. Also *Pacific Rural Press*, 4 August 1883. In part, the empiricism and non-interventionist stance of California physicians reflected their regional self-consciousness, as John Harley Warner has suggested. Resenting the dominance of their Eastern colleagues and faced with new environments, they emphasized the importance of local environmental knowledge to proper treatment. See [Logan], “Report on Medical Topography and Epidemics in California,” 120.

"those natural emunctories, the skin and kidneys, which the bracing climate is continually stimulating to do the work of depuration."<sup>104</sup>

In the eyes of empirically minded physicians such as Logan, rationalist desires could not simply be imposed upon either bodies or landscapes without the risk of serious consequences. The practices of both cultivation and medicine needed to mimic nature, even while they sought to improve upon nature. Their belief in "natural" healing blurred the boundaries between human bodies and the environment. From the perspective of these physicians, the environmental effects of settlement in California were quite disturbing. Enmeshed in an environment that they did not yet fully understand, settlers had only aggravated unfavorable conditions. Settlement might not necessarily bring health but its very opposite, particularly if nature's patterns were not adequately respected. Similarly, they argued that heroic medical practices such as bleeding and purging were not indicated by nature and would only exacerbate illness. Writing in 1875, having observed the uncontrolled spread of irrigation across the Central Valley, Thomas Logan warned that if Californians proceeded on their current course, they might well end up with an environment as sickly as that of the South with its "notoriously miasmatic rice

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<sup>104</sup> [Logan], "Report on the Medical Topography and Epidemics of California," 120. For a popular recognition and endorsement of "natural" medicine, see "Concerning Sanitary Science," *Pacific Rural Press*, 4 August 1883, p. 93.

fields.”<sup>105</sup> In the eyes of Logan, Californians -- for their own sake -- needed to adhere to nature and heed the limits of both their bodies and their environment.

Even more so than doctors, engineers are associated with abstract plans of rationalization and the rhetoric of environmental conquest. Yet they, too, engaged in a rhetoric that emphasized the mutual relationship between human beings and the landscape, and they castigated their nineteenth-century contemporaries for careless and unthoughtful intervention. Moreover, they typically cast their own projects as attempts to adhere to, and improve upon, existing *natural* plans. But while they shared with doctors and others the desire to reshape the valley along natural lines, disagreements emerged over how and where that might be possible. To oversimplify somewhat, California physicians were more likely to counsel extreme caution with respect to environmental transformation and to urge close empirical observation of the relationship between human beings and a transformed nature. Engineers, on the other hand, while respecting the link between environment and health, more often advocated an active mediation of that relationship. Like doctors, they strongly criticized many of the era's environmental projects, but they were more likely to argue that the link between environment and human beings necessitated careful planning and professional control rather than passivity. Perhaps not surprisingly, they argued that they, as engineers, should be in charge.

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<sup>105</sup> Logan, “Malarial Fevers and Consumption in California,” 117.

Although many of the engineering proposals of the nineteenth century appear quite bold, they frequently emerged out of a concern *for* nature and a desire to rectify the environmental mistakes that settlers and landowners had already committed. Like farmers, nineteenth-century engineers recognized the fluidity and dynamism of the natural landscape and the precarious nature of human interventions. They also recognized the vital role of local, experiential knowledge, and emphasized the need to study the details of particular environments in order to fully understand them. Engineers, at least in California, eschewed over-generalization and counseled attention to local environmental conditions.<sup>106</sup>

Nowhere was this more clear than in many of the proposals for reclamation that California engineers put forth in the late nineteenth century, one of the era's critical engineering problems. The Sacramento River had continually frustrated the attempts of settlers and landowners to establish an orderly agrarian landscape in the northern and central sections of the valley. On the one hand, the river's regular overflows contributed to the fertility of the adjacent land -- generating comparisons to the Nile River basin.<sup>107</sup> On the other hand, in high-water years, the river could spread out across a ten- or even twenty-mile swath, claiming human and animal lives by the score, destroying crops,

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<sup>106</sup>See, for instance, William Hammond Hall, *Report of the State Engineer to the Legislature of the State of California -- Session of 1880[-81]*, 12; C.E. Grunsky, "Some Aspects of the Flood Control Problem," 12 January 1932, Grunsky Family Papers, Bancroft Library, Berkeley.

<sup>107</sup>*Report of the Commissioners Appointed by an Act of March 28, 1868 on the Reclamation of Swamp Lands in the Sacramento Valley*, 5, reprinted in California Legislature, *Appendix JCSA* 18:2 (1870).

orchards, and houses. Like moths to a candle, settlers could not resist the fertile soil near the river, and so they built levees to try to keep out the worst floods. But a levee on one side of the river served only to push the river somewhere else -- either to the other side, or further downstream. One farmer's success was another's disaster. By the 1870s, the valley was a patchwork of reclamation districts and levee systems, with little coordination. Farmers threw up levees when and where they could.<sup>108</sup>

When engineers surveyed the result, they saw man-made chaos that was disrupting natural order. Accordingly they cast their own proposals as efforts to restore and further that order. Civil engineer Calvin Brown, who offered a plan for the reclamation of the valley in 1862, argued that his proposal was "but a simple imitation, though of course on a limited scale, of nature's own questions...."<sup>109</sup> Similarly, after decades of debate over how best to control flooding in the Sacramento Valley, engineers Marsden Manson and Carl Grunsky wrote a detailed report for the California Commissioner of Public Works based on twenty years of hydrologic data and supported with detailed calculations of streamflow volumes throughout the valley. Yet they defended their plan not as a technological fix that needed to be imposed upon the landscape but as a *return* to nature. As they put it, "The proposed by-pass system of river treatment is not now presented as a new idea. It is a return to first principles as pointed

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<sup>108</sup> The so-called "levee wars" are the subject of Robert Kelley's classic book, *Battling the Inland Sea: Floods, Public Policy, and the Sacramento Valley* (Berkeley: University of California Press, 1989).

out by nature." Moreover, they argued that a *rational* landscape was precisely one which sought to re-establish natural conditions, at least to some degree.<sup>110</sup> As their former colleague, William Hammond Hall had argued, "Nature defines the drainage districts," and thus attempts to fashion political and institutional boundaries that did not adhere to natural boundaries were doomed to failure.<sup>111</sup> Manson and Grunsky did not argue that the valley should be left in its natural state of seasonal marsh. They proposed an extensive system of by-passes and overflow channels -- essentially a re-engineering of existing natural sloughs -- as a means of moving flood waters through the valley more quickly and thus allowing for more agricultural development. Like their agricultural counterparts, they proposed to finish, rather than to disregard, the natural landscape.

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<sup>109</sup> Calvin Brown, "On the Utilization of Water, and its Sources, in California," California Surveyor-General, *Annual Report 1861-62* (Sacramento, 1862), 33.

<sup>110</sup> "Report of Consulting Engineers," in California Commissioner of Public Works, *Report, 1893-94* (Sacramento, 1895), 25-138. Manson and Grunsky's report did not represent a consensus engineering opinion on the valley. For several years, the Army Corps of Engineers had advocated an alternative plan, one which involved improving the main channel of the river and building higher and stronger levees to force the river to deepen its own channel. This plan was consistent with the Corps's treatment of river systems nationwide, developed from its research and experience on the Mississippi River. The different approaches to the Sacramento can be understood in part as a regional and institutional one. Manson and Grunsky were not influenced by institutional loyalty to the Corps, nor did they derive their practical experience from elsewhere. Their intimate familiarity with the California environment underlay their engineering philosophy. On Manson and Grunsky's report, see Kelley, *Battling the Inland Sea*, 238-41. On institutional commitments and conflicts within the Corps of Engineers, see Martin A. Reuss, "Andrew H. Humphreys and the Development of Hydraulic Engineering: Politics and Technology in the Army Corps of Engineers, 1850-1950," *Technology and Culture* 26 (January 1985), 1-33 and George S. Pabis, "Delaying the Deluge: The Engineering Debate over Flood Control on the Lower Mississippi River, 1846-1861," *Journal of Southern History* 64 (August 1998), 421-54.

<sup>111</sup> William Hammond Hall, "Annual Report to the Governor --Draft," 1878, box 6, MSS 1970 (William Hammond Hall Papers), California State Library.

The idea that nature itself legitimated certain environmental transformations and not others was more than useful rhetoric. Nineteenth-century concerns with mimesis were not simply a Darwinian-inspired attempt to naturalize all human actions. In fact, the language of mimesis implies the opposite, that human beings can, in fact, operate in ways that nature does *not* sanction. When actions did not have their intended results, critics were quick to cite the failure to adhere to natural designs. Writing in 1878 of the many failed efforts at flood control in the Valley, William Hammond Hall had remarked that:

Now that the owners of a great portion of these [marsh and delta] lands have attempted to embank against floods, it has been found that nature – as represented in the great drainage systems – has not received fair treatment, and the works of men have been overpowered and swept away.<sup>112</sup>

Another individual cited an instance of irrigation along the Merced River (in the central San Joaquin Valley) which led to a marked increase in malarial diseases. The writer, a doctor, noted that “[a]s far as I have been able to learn, this was a healthy locality till the water of the river was turned out of its *proper* channel [emphasis added],” implying that the failure to adhere to larger natural designs on the landscape were ultimately the source of problems.<sup>113</sup> Or as another stated more bluntly in response to the crop failures of 1871,

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<sup>112</sup> *Ibid.*

<sup>113</sup> Orme, “Irrigation – Its Influence on Health,” 55.

“If all our grain farmers had followed the teachings of nature more closely,...failure of crops would have been much less frequent.”<sup>114</sup>

Yet mimesis was a tricky concept. Even while ostensibly following nature’s lead, things might be easily thrown out of balance. What worked in one locality might prove disastrous in another -- irrigation canals were a case in point. Nonetheless, the language of mimesis helped to assuage anxieties about the human place in an unfamiliar landscape. Moreover, the prevalence of such language calls into question standard interpretations of the nineteenth-century United States which assert that European Americans in this period held an unbridled faith in technology and engineering science and evinced little concern for the natural condition of the landscape, at least so far as agricultural regions such as the Central Valley were concerned.<sup>115</sup> To the contrary, nineteenth-century Californians debated the wisdom of proposed interventions, looked to nature for guidance, and struggled with their desire to transform the landscape for material gain on the one hand, and their desire to conform to natural designs on the other.

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<sup>114</sup> *Pacific Rural Press*, 24 June 1871.

<sup>115</sup> With respect to the Central Valley, Robert Kelley writes, for instance, "Mid-nineteenth century Americans...were confident, impatient, entrepreneurial, defiant of life's limitations, and determined actively to possess and develop the enormous continental expanse that had now opened before them. So optimistic were nineteenth-century Californians, so assured were they that the environment could be manipulated as they wished, that they went on proclaiming their confidence to themselves...despite the repeated failure of their plans and projects. Kelly, *Battling the Inland Sea*, quote from 14-15, also 125-26. Donald Pisani makes a similar appraisal in *From the Family Farm to Agribusiness*, 116.

It was within this cultural context that nineteenth-century engineers began to recast the notion of agrarian finishing. It is somewhat ironic that, even while emphasizing mimesis and the intimate connection between environmental change and human health, Californians undertook a dramatic reorganization of the Central Valley environment. As Manson and Grunsky's flood control plan illustrates, even those projects that "mimicked" nature might be quite ambitious in their scope. Nineteenth-century engineers, however, saw their work as a form of "finishing" that if properly implemented would complement and further nature's own plans. Thus they saw the problem of irrigation and disease as one that could be remedied through proper engineering. They felt that the project of finishing was no longer the work of the farmer alone, but equally that of the engineer. As one California engineer remarked, "It has been said that the Almighty gives no finished works to the hands of man. While that is true, he does give the engineer, in order that his work may be finished."<sup>116</sup>

In the last third of the nineteenth century, civil engineering was a profession on the rise. Between 1850 and 1880, the number of engineers in the U.S. increased sixteen-fold and most of this growth came specifically within civil engineering. Moreover, during the same period, engineers underwent a remarkable professionalization, marked by the founding and growth of numerous engineering societies and the rise of formal engineering societies. In California, engineers published several technical journals and

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<sup>116</sup> Cited in Carroll W. Pursell, Jr., "The Technical Society of the Pacific Coast, 1884-1914," *Technology*

also formed the Technical Society of the Pacific Coast, a group to which all the most prominent regional engineers belonged and which took it upon themselves to debate some of the region's most pressing environmental issues, such as hydraulic mining and irrigation.<sup>117</sup>

The most common theme of engineering discussions and writings in the period was the failure of Californians to deal with the environment in a planned and thoughtful fashion. Engineers repeatedly blamed environmental problems on human actions, much as physicians did. William Hammond Hall, for instance, criticized early reclamation efforts in the valley as "the most injudicious, unmethodical and ineffectual," and characterized the result as nothing less than "disastrous."<sup>118</sup>

Engineers viewed the problem of irrigation and disease similarly. In 1874 the federally appointed irrigation commission (composed of engineers) blamed the increase in miasma and disease in the valley on ill-conceived private irrigation works which had failed to follow the principals of hydraulic engineering.<sup>119</sup> Fifteen years later, Hall made a similar claim. Writing in 1889 of the situation in Fresno, Hall acknowledged that

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*and Culture* 17 (October 1976), 702-17, quote from page 709.

<sup>117</sup> Raymond H. Merritt, *Engineering in American Society, 1850-1875* (Lexington: University of Kentucky, 1969); W.H.G. Armitage, *A Social History of Engineering* (Boulder, CO: Westview Press, 1976); Nancy Farm Mannikko, "Brothers Professionally and Socially: The Rise of Local Engineering Clubs During the Gilded Age," (Ph.D. diss., Virginia Polytechnic Institute, 1997); Pursell, "The Technical Society of the Pacific Coast."

<sup>118</sup> Hall, "Annual Report to Governor -- Draft."

<sup>119</sup> Congress, House, *Report of the Commissioner of Agriculture for the Year 1874*, 43rd Cong., 2nd sess., 1875, p. 356.

irrigation had, in fact, brought miasma and disease to a “county which was [at one time] regarded as phenomenally healthy” -- but he asserted that the situation could be quickly remedied if farmers would undertake a systematic effort to drain their lands. Hall made explicit the need for professional engineering oversight which he believed would “soon correct the matter.”<sup>120</sup>

From a contemporary, positivist perspective, we could say that engineers such as Hall were right about irrigation, but for the wrong reasons. Engineers, like lay people and doctors, tended to attribute malaria to the presence of excess water that increased vegetative decay; while from our perspective the problem was not the unleashing of miasmatic vapors latent in the ground, but the problem of standing water in poorly drained soils that created new habitats for *Anopheles* mosquitoes.<sup>121</sup> But more revealing than a critique of the adequacy of nineteenth-century science is a consideration of the attitudes that engineers held about landscape, disease, and technology. While ascribing to the same miasmatist theories as doctors, engineers were convinced that engineering could enhance the landscape. Whereas many physicians had come to question the wisdom and

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<sup>120</sup> William Hammond Hall, “Irrigation in California,” *National Geographic Magazine* 1 (1889), 287-88. J.P. Widney, a prominent physician in southern California, also recognized the possibility that drainage might, in some cases, correct the problem. Widney, “Irrigation and Drainage,” in California State Board of Health, *Seventh Biennial Report 1880-81* (Sacramento, 1882), 106.

<sup>121</sup> The principle mosquito vectors in California have been *Anopheles freeborni* and *Anopheles punctipennis*. Another possible reason for the increase in malaria in the post-settlement period, however, was the reduction of animal populations that mosquitoes had previously fed upon. Gray, “The Confusing Epidemiology of Malaria in California.”

desirability of extending irrigated agriculture in California, engineers and their supporters were much more sanguine.

Hall expressed his frustration at those who were skeptical of what engineering might accomplish, and who derided as hopelessly theoretical his own plans for draining and irrigating the valley. As Hall put it, “Evidently [they] don’t know that [engineering] theory is founded on an intelligent study of practice.”<sup>122</sup> Hall, like his counterparts in California and across the nation, believed fervently in the need for government control and professional management of the environment. He acknowledged the unhealthy nature of the land but believed it had been vastly exacerbated by human ignorance and *uncontrolled* and *unscientific* development. As he wrote to a well-known engineer who was to consult with him on California’s river problems:

I feel assured that you will...tell these Californians that they cannot deal with nature on Democratic principles, and in a speculative spirit....We have some great problems here...but the primary one is to educate an impatient and vain public, to that point where they will permit us [engineers] to take hold of the real questions methodically and in earnest.<sup>123</sup>

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<sup>122</sup> William Hammond Hall Diary, April 1889, carton 1, William Hammond Hall Papers, Bancroft Library, Berkeley.

<sup>123</sup> William Hammond Hall to James B. Eads, 1 November 1879, letterbook 3, box 1, MS 914 (William Hammond Hall Papers), California Historical Society, San Francisco.

From Hall's perspective, it was up to Californians to own up to their environmental responsibilities. And even while he argued for the importance of local knowledge, he believed that a methodical rationalism, represented in the person of the professional engineer, should guide decisions about the landscape.<sup>124</sup>

Like their medical counterparts, late nineteenth-century engineers in California still looked to local experience and chafed at the application of strictly rationalist or abstract approaches to their unique problems, but they also embraced an universalist method that gave them confidence in their ability to rework their immediate environment. They believed that their own abstract knowledge, combined with experience, could guide decisions about the landscape. This was perhaps the optimism of a relatively youthful profession confronting a new set of problems. Of course it is also possible to attribute the optimism of engineers to polite subterfuge, given that they stood to gain from the extension of irrigation and the consequent demand for engineers and engineering work. Unquestionably the imperatives of capitalist development were pushing the expansion of irrigated agriculture in California, and engineers were active and often eager participants in those developments. Nevertheless, engineers and others could not, and did not, deny the biological realities of disease. As they knew from experience, they and their families were vulnerable.

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<sup>124</sup> William Hammond Hall to Mr. Moulder, 1871, box 2/2, William Hammond Hall Papers, Bancroft Library, Berkeley.

Hall was personally attuned to the problems of environmental health. He was raised in the valley town of Stockton -- and, after his move to San Francisco his letters to his family frequently contain inquiries over health and sickness in the region. His mother, for instance, counseled him to avoid visits during sickly seasons. And on more than one occasion, Hall was reluctant to bring his wife and young daughter to Stockton during the autumn season for fear that they might become ill.<sup>125</sup> When his appointment to the position of State Engineer occasioned his move from San Francisco to Sacramento, Hall confided to his diary:

I doubt the wisdom of bringing my family to this confounded sickly place. Typhoid fever, intermittent fever of all kinds -- the regular old ague appears to be not only prevalent but severe.

A nephew of [?] died today of typhoid fever. I can only try to keep my wife and little ones away from here in the most unhealthy times and trust to God and good care for their protection at other times.<sup>126</sup>

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<sup>125</sup> See for instance, William Hammond Hall to Anna Marie Hall, 19 April 1875, box 1/5, William Hammond Hall Papers, Bancroft Library, Berkeley. Letters from Anna Marie Hall to William Hammond Hall, 21 September 186[9], 30 January 1870, 23 July 18[70], 7 January 1871, box 13/25, *ibid*.

<sup>126</sup> William Hammond Hall Diary, 3 September 1878, box 1137/1, William Hammond Hall Papers, California State Library. Hall himself became quite interested in issues of local health and sanitation. See the materials in box 1/4, MS 913 (William Hammond Hall Papers), California Historical Society.

Furthermore, among the team of engineers employed by Hall in the late 1870s to survey the state's water resources, an entire survey party had fallen ill with fever while working in the valley.<sup>127</sup>

Despite the constant threat of disease, Hall and others asserted that when undertaken properly, irrigation could actually *improve* both the landscape and the health of local residents. "There have been curious climatic changes in this State," Hall argued,

which we must attribute to irrigation. For instance, I remember to have gone to Bakersfield some years ago when irrigation was first being introduced there. I do not know whether this ought to be recorded, but I was struck with the very curious appearance of shape of the younger ladies... in that section. It seems that I could not account for it at the time, but it turned out that they had a little affection of the spine, and there was a rotundity of the trunk which was astonishing in ladies so young. I tell you [this] to illustrate the fact that before irrigation was regularly introduced, there was a malarial influence which pervaded the population..., and it showed not only upon the countenance of the people, but upon their persons. But now that the slough has been cleaned out ...[and] fresh water... applied to the land..., the atmosphere and the climatic conditions appear to have changed to that extent that I believe

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<sup>127</sup> William Hammond Hall, *Report of the State Engineer of California to the Legislature* (Sacramento, 1886-88), 1:25. Also, advertisements for "liver pads" and other cures for "fever and ague" were common in engineering journals as well as more popular publications, e.g., *Engineer of the Pacific* (December 1878), 8.

Bakersfield ...is about as healthful a locality as you will find in any portion of this State. And I attribute it to irrigation.<sup>128</sup>

Here Hall acknowledged that human beings -- particularly women -- were highly vulnerable to their environment, that the effects of the environment on human bodies were, in fact, visually evident. Significantly, Hall engaged a language of the body when discussing the potential of engineering -- which to us sounds strange, even comic. But within nineteenth-century culture, such a language made perfect sense. The environment inscribed itself upon its inhabitants in both visible and invisible, positive and negative, ways.

Despite his own commitment to the scientific study and abstract knowledge, William Hammond Hall did not engage in a rhetoric of conquest; instead, he acknowledged the interchange between human beings and their environment, the fluidity of the body-environment boundary that imperiled any effort to treat the landscape as a distinct object, separate from the human beings who manipulated it. Hall believed that the environment was, in turn, vulnerable to human actions, and his recognition of humankind's ability to alter the environment was not completely sanguine. No one, for

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<sup>128</sup> "Statement of William Hammond Hall," in Senate, *Report of the Special Committee...on Irrigation and Reclamation*, 217. There seems to have been a general consensus that the climate and health of Bakersfield had improved as a result of irrigation. For instance, in 1880 James Schuyler (an engineer and colleague of Hall's) wrote that "the change for the better in the climate of [Kern County]..., since the general introduction of irrigation, has been as marked as the improvement in the soil." See Schuyler, "Report on the Works and Practice of Irrigation in Kern County," in Hall, *Report of the State Engineer to the Legislature*, 4:109-10.

instance, was more conscious of the havoc wreaked upon the landscape by mining debris. As he wrote elsewhere, “There now remains little doubt but that man may, and does...mold the apparently natural surroundings of his home.”<sup>129</sup> In this and other statements, Hall echoed the ideas of the forest advocate Abbot Kinney and others who argued that through cultivation and planting human beings were altering the climate and the healthfulness of the landscape for better and for worse.<sup>130</sup> Hall was quite conscious of the fact that the incremental and not-so-incremental interventions of human beings were yielding a “second nature,” that was in turn *affecting* human beings.<sup>131</sup> Such a feedback loop implied that human beings were fully enmeshed in the landscape, that human actions engendered natural reactions that ultimately shaped human potential.

The link between landscape and health evident in discussions of miasma and irrigation resonates with the ideas and work of Frederick Law Olmsted, a representative figure of the period. In his park designs, Olmsted presumed that human bodies were responsive to the environment and accordingly he sought to fashion a “natural” space that was not merely pleasurable, but curative. Olmsted emphasized the physical effects of

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<sup>129</sup> William Hammond Hall, “Influence of Parks and Pleasure Grounds,” *Overland Monthly* 11 (December 1873), 527.

<sup>130</sup> Elsewhere Hall had acknowledged that cultivation and irrigation seemed to be increasing precipitation in both Los Angeles and the San Joaquin Valley, but Hall deferred a final opinion on the matter, calling for more data. See “Statement of William Hammond Hall,” in Senate, *Report on the Irrigation and Reclamation of Arid Lands*, 218.

<sup>131</sup> I am borrowing the phrase “second nature” in this context from William Cronon, *Nature’s Metropolis: Chicago and the Opening of the Great West* (New York: Norton, 1992), 56.

landscape, as well as the psychological and moral benefits.<sup>132</sup> Although some landscapes might be naturally effective in producing health, most had to be manipulated in order to produce the desired outcomes. The landscape architect rearranged nature according to his own designs. Forethought and planning were critical to successful intervention. But in the end, the individual park-goer was subject to the agency of nature itself.<sup>133</sup>

Although the landscape architect had the power to manipulate nature's materials for better or for worse ends, ultimately the greater agency lay with nature, not with human beings.

Interestingly, William Hammond Hall was also a park designer -- as the first superintendent of Golden Gate Park -- as well as a life-long admirer of Olmsted.<sup>134</sup> Like Olmsted, Hall believed in the curative power of natural parks -- and he went so far as to urge his ailing mother to make the journey from Stockton to San Francisco, so that she might reap the physical and psychological benefits of his own urban pleasure ground.<sup>135</sup>

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<sup>132</sup> Frederick Law Olmsted quoted the prescriptions of a physician who argues that time spent in parks improves the health of his patients; he also argued that the rebuilding of disease and crime-ridden sections of the city might improve the health of the entire city. F.L. Olmsted, "Public Parks and the Enlargement of Towns," in S.B. Sutton, ed., *Civilizing American Cities: A Selection of Frederick Law Olmsted's Writings on City Landscapes* (Cambridge, MA: MIT Press, 1971), 66, 93-94. Also Nancy D. Munn, "Excluded Spaces: The Figure in the Australian Aboriginal Landscape," *Critical Inquiry* 22 (September 1996), 446-65.

<sup>133</sup> Here I am indebted to the insights of literary critic Richard Grusin, particularly his work on Olmsted and Yosemite Park.

<sup>134</sup> Hall dedicated his unpublished book on Golden Gate Park to Olmsted. William Hammond Hall, "Romance of a Woodland Park," (n.d.), carton 5/18-19, William Hammond Hall Papers, Bancroft Library, Berkeley.

<sup>135</sup> William Hammond Hall, "Influence of Urban Parks," and Letter to John Buchanan Hall, 17 June 1867, box 1/5, William Hammond Hall Papers, Bancroft Library, Berkeley.

Thus it is perhaps not too much to claim that nineteenth-century engineering and Olmstedian landscape architecture were complementary endeavors. They both presumed an intimate connection between landscape and bodies, and, because of that connection, they optimistically sought to re-order nature to render a more habitable and healthful environment. The difference between landscape architecture and engineering for Hall was merely one of scale. While the urban park reordered nature on a local scale to benefit individuals and families, engineering might potentially reorder the environment of the entire state or nation. It is thus possible to read the large-scale engineering projects of Hall and others as landscape architecture writ large.

From this perspective, the rational reordering of nature could yield not merely profits, but also social, psychological, and even physiological, benefits. This was Jeffersonian agrarianism in a new, more material, and corporeal, form. Thus, engineers defended the Central Valley as an area that, while potentially unsuitable for settlement in its natural state, could be made amenable to human habitation through the careful application of science and reason.<sup>136</sup> That, in fact, was their job as engineers. And in pursuing it, they were not dominating nature so much as engineering a new harmony between nature and human bodies. While unthoughtful and unsupervised interventions were bound to lead to bad outcomes, good engineering would not simply make the land

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<sup>136</sup> For Hall's initial, and exceedingly negative, reaction to the San Joaquin Valley, see William Hammond Hall to Anna Marie Hall, 4 September 1876, box 2/5, William Hammond Hall Papers, Bancroft Library, Berkeley.

more productive, it would also make it more healthy. In other words, they intervened in the landscape not because they saw themselves as separate and independent of the environment -- in the classic Cartesian sense -- but precisely because they recognized their imbrication in a larger natural world. As human beings, they sought to engineer a landscape that would in turn engineer them.

In this way, nineteenth-century engineers began to resolve the contradiction between narratives of environmental determinism on the one hand, and those narratives, including agrarianism, which linked civilization and health on the other. Human beings were both subject to their environment, and yet also capable of reordering that environment. Such thinking would underlie the movements of public health and sanitary science associated with turn-of-the-century Progressive reform, in which engineers would play a major role, and also, as we will see, the modernist discourses of technology that emerged in the 1920s and 30s. Engineers accordingly bridged a nineteenth-century world in which the environment was experienced and understood as an immediate and active agent, and a twentieth-century world in which the dominant discourses about nature would be those of bureaucratic rationalism.<sup>137</sup> Yet the perceived connection between landscape and bodies did not necessarily lead to a stance that advocated little or no intervention. To the contrary, such a connection could serve to underwrite radical transformations of the landscape. And that is what would happen in the Central Valley.

The discovery of the link between mosquitoes and malaria via germ theory at the turn of the century would, of course, eventually serve to further localize disease and to help sever, or at least attenuate, the cultural link between landscape and bodies.<sup>138</sup>

Accordingly, this would open up the landscape to new types of intervention -- in the form of DDT and other pesticides -- with little concern evinced, initially, for their direct effect on human health.<sup>139</sup> Yet ironically the mosquito discovery would have little practical effect on the course of irrigation in the Valley. Engineers and others had already resolved, intellectually, the dilemma over intervention.

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<sup>137</sup> See, for instance, Linda Nash, "The Changing Experience of Nature: Historical Encounters with a Northwest River," *Journal of American History* 86 (March 2000), 1600-29.

<sup>138</sup> For literature that insists on the ultimate significance of germ theory, see Thompson, "Insalubrious California," and "Irrigation as a Menace to Health." In fact, severe yet localized outbreaks of malaria continued to develop around irrigation projects in California well into the nineteen-teens. See Gray and Fontaine, "A Short History of Malaria," 36.

<sup>139</sup> In many instances, in fact, DDT was used as a human health measure, particularly in tropical environments. In the Central Valley, the main impetus for the use of DDT was to control agricultural pests, although human health benefits from mosquito control were also important. D. Spiller, *Mosquito Problems in California's Central Valley* (Berkeley: University of California, Division of Agricultural Science, 1968). On arguments for DDT more generally, see Thomas R. Dunlap, *DDT: Scientists, Citizens, and Public Policy* (Princeton: Princeton University Press, 1981).

**Part II: Engineered Bodies and Engineered Landscapes  
in the Twentieth Century**

## *Chapter Four*

### **The Central Valley Project**

In the twentieth century, engineers would have a paramount role in transforming the environment of the Central Valley. With the growth of both the federal and state governments and the technological advances that accompanied both of the world wars, engineers found themselves in a position to realize many of their grandest environmental visions. Within the Central Valley in particular, they set about reorganizing space to an unprecedented degree. The Bureau of Reclamation's Central Valley Project, commonly called simply the "CVP," still represents the single most massive reorganization of the valley's environment. Certainly other environmental transitions have been equally far-reaching -- the suppression of wildfires, the introduction of livestock, the rise of large-scale wheat farming -- but what made the CVP unique was its spatial and technical scope and the degree of planning that lay behind it. The CVP was a product of the Progressive belief that entire regions could be planned, reworked, and centrally managed. Those behind the project imagined and eventually accomplished a complete reorganization of the valley's hydrology, storing water on the flood-prone Sacramento so that it could be transferred to the drier San Joaquin Valley. To accomplish this required not only two extremely large concrete dams, but the supplementation of the rivers themselves with a

major aqueduct, canal, and pumping system. Such Herculean efforts at water management signaled a new dimension in the production of both space and human beings in the Central Valley.

Much has been written about the historical context that gave rise to the CVP. Historians have convincingly shown the ways in which institutional imperatives, economic conditions, and the power of large and wealthy farmers combined to build support for a massive water project in California and to exempt many of its beneficiaries from the provisions of the original reclamation law.<sup>1</sup> Meanwhile, those scholars who have sought a cultural, rather than a strictly instrumentalist, impetus for the project have argued that it exemplified in a nearly unparalleled fashion the Euro-American desire for the "conquest" of nature.<sup>2</sup> For most environmental historians, engineering has been the

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<sup>1</sup> Typically the agency's turn towards large dam and power projects in the 1930s is interpreted as its own institutional bid for success after nearly three decades of failure and, at the same time, as a betrayal of its earlier agrarian mission. Reclamation law limited the provision of water from U.S. Bureau of Reclamation projects to farms of no more than 160 acres, in keeping with the laws intention of furthering the family farm in the western U.S. However, when the Bureau took over the Central Valley Project (originally conceived as a state project and thus not subject to the acreage limitation) a considerable amount of land was already in farms in excess of 160 acres. Many Californians immediately began lobbying for an exemption from the law. Although such an exemption was never passed, in practice, the law was not enforced in California. See Norris Hundley, Jr., *The Great Thirst: Californians and Water, 1770s-1990s* (Berkeley: University of California Press, 1992), 257-68; Clayton Koppes, "Public Water, Private Land: Origins of the Acreage Limitation Controversy, 1933-1953," *Pacific Historical Review* 47 (November 1978), 607-36; Charles E. Coate, "Water, Power, and Politics in the Central Valley Project, 1933-1967" (Ph.D. diss., University of California at Berkeley, 1967); Mary Montgomery and Marion Clawson, *History of Legislation and Policy Formation of the Central Valley Project* (New York: Arno Press, 1979).

<sup>2</sup> In perhaps the most influential history of the valley, Donald Worster has argued that the region's large water projects were the result of the urge to dominate nature on the part of bureaucratic elites. In Worster's telling, the urge to dominate nature led ultimately to the domination of human beings as witnessed in the region's social inequality. In response to Worster, Norris Hundley has emphasized the democratic processes that have both endorsed and checked institutional power in the region; Hundley, however, similarly endorses a general view of Anglo-American culture as one in which attitudes towards the environment were distinguished by the desire for resource exploitation and conquest. See Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (New York: Pantheon, 1985); Hundley, *Great Thirst*.

principal location of discourses of technological rationalism on the one hand, and narrowly conceived institutional interests on the other. And engineers themselves have typically been characterized as those most committed, professionally and institutionally, to visions of the technological domination of nature. Accordingly, both historians and environmentalists have viewed the CVP as an endeavor that evinced little or no concern for the natural space of the valley. It was, in fact, hostile to the seasonal and highly variable landscapes of the region, and it failed to value natural habitats and wildlife -- wetlands, salmon, and seasonal floods were among the many things sacrificed to create a more rational hydrology. Thus, the cultural story, many have argued, was simply the urge to dominate nature through the increasing use of technology.

Yet there are other ways to consider engineers and engineering. As the documents of nineteenth-century individuals suggest, engineers considered themselves as intermediaries between the natural and social worlds, as those most capable of understanding nature and natural laws, and as those best equipped to shape human use of the landscape. The historical problem that underlies this chapter is how to view and interpret the CVP in more nuanced cultural terms and, at the same time, to unpack the visions of nature and human beings held by those who most directly planned and constructed the project. While the CVP unquestionably served the institutional and economic goals of certain elites and corporations, what made such an extraordinary project possible was that it embodied cultural goals that appealed to many more Americans than those who benefited directly from it. Moreover, the primary cultural significance of the project was not so much that it expressed a consistent and widely

shared urge to dominate nature, but that it reflected and advanced a reformulation of the project that I have labeled "finishing," which was consistent with American nationalism. As in the nineteenth century, in the construction of space lay also the construction of identity. Yet in this reformulation, it was technology rather than nature that was perceived as increasingly central to American identity, and, more particularly, to white masculinity. What differentiates twentieth century discourses of both nature and nationalism from those of the preceding century is the foregrounding of technology. Over the course of the mid twentieth century, engineering gradually came to replace agriculture as the principal and most visible means by which white men, at least, aspired to engage and rework nature.

While nineteenth-century Californians certainly lauded and quickly capitalized upon technological advance, they nonetheless still understood the landscape primarily through their own immediate and bodily relationship to it -- through movement, labor, and disease. Human bodies were understood as intimately and materially connected to the surrounding natural landscape, for better or for worse. Alterations to the landscape had to be considered in relation to their direct effects upon human beings. Human beings shaped nature which in turn shaped them.

The rise of a modernist discourse of technology in the 1920s and 30s both echoed and altered this equation. For those Americans who moved off of farms, and even for those who remained, technology increasingly mediated relationships between human beings and nature -- and these mediations were increasingly in the hands of professional elites. Within the valley itself, it was no longer simply a question of individuals deciding

to plant orange trees rather than wheat, or to dig an irrigation canal to the river. Instead, engineers in Sacramento and Denver remapped the valleys' rivers and streams and determined when, where, how much, and even what direction, they would flow. Water became an engineering abstraction, increasingly disconnected from the landscape (at least in theory), for which farmers paid a fixed price, while rivers became efficiently constructed conduits, which engineers shut on or off at will.

Within such a technological landscape, human bodies were no longer perceived as emanations or reflections of an essentially "natural" environment. Human beings still needed to harmonize with their surroundings; only now, technology offered a more thorough means of adapting the environment. Of course, the desire to adapt the environment was already present in the nineteenth century, particularly in the writings of those who advocated modifying the climate through certain types of planting and the extension of agriculture through irrigation. But by the 1930s, the environment was no longer understood as essentially a "natural" landscape that remained to be finished through agricultural labor, but as a emerging hybrid of nature and human technology, a product of modern engineering. Human beings were still subject to their environment, but their capability and responsibility for modifying that environment was now substantially greater than ever before. In modernist thinking human beings shaped technology which in turn shaped them. As technology increasingly infiltrated modern life and further blurred the boundaries between nature and culture, engineer emerged as the predominant discourse about the valley's environment.

In a sense, modern engineering rewrote the older agrarian script in technological terms. The landscape still required finishing, but now such work was the job of engineers rather than farmers. Moreover, those who belonged on the land were those most capable of altering it in a rational fashion. Technological adaptation replaced biological adaptation as the criterion for belonging. Yet, ironically, technology not only remade the landscape, it ultimately required the reconceptualization and eventual remaking of human beings. As human beings shaped space through labor and technology, space still shaped its occupants. But now bodies, like the natural environment, potentially required rational organization, planning, and technological adaptation. To their surprise, engineers found themselves finishing men as well as nature, engineering both landscapes and bodies.

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The idea of developing a comprehensive irrigation plan for the entire valley had its roots in the plans and efforts of State Engineer William Hammond Hall in the 1880s, and in scattered pronouncements and individual plans that had preceded Hall in the nineteenth century. But it was only at the end of the Progressive era that such plans began to take more definitive shapes. In the 1917 the state of California, along with the U.S. Army Corps of Engineers, finally undertook a comprehensive plan to control flooding in the Sacramento Valley, following a half-century of debate over how to manage the river's overflow.<sup>3</sup> In that same decade, several plans emerged that sought to

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<sup>3</sup> Robert Kelley, *Battling the Inland Sea: Floods, Public Policy, and the Sacramento Valley* (Berkeley: University of California Press, 1989), 292-93.

provide a comprehensive system of irrigation by linking the Sacramento and San Joaquin valleys with a system of dams and canals. The most important of these plans was that put forth by the U.S. Army topographer Robert Marshall. The "Marshall Plan" called for a major dam on the upper Sacramento River as well as a system of aqueducts that would allow the irrigation of both valleys, particularly the dry southern San Joaquin. Marshall's plan also provided for improved navigation in the Delta region, irrigation water for Los Angeles, and additional municipal water supplies for the Bay Area.<sup>4</sup>

Despite the existence of such plans in the 1920s, it would only be with the expansion of the federal state in the New Deal era that any comprehensive irrigation plan would be put into motion. Marshall's original plan failed to gain legislative approval. Then, in 1931, State Engineer Edward Hyatt released a new and more detailed statewide water plan that reiterated many of the key features of Marshall's plan. Hyatt's plan received legislative endorsement in 1933; yet the onset of the Depression precluded its funding. In 1935, Franklin Delano Roosevelt provided federal funds to begin construction, and in 1937, the U.S. Bureau of Reclamation took the project over. In its barest outlines, the plan envisioned two ultra-large dams, a second smaller dam, two power plants, five major canals, and a massive water-pumping plant in the Sacramento-San Joaquin Delta.

If agrarianism was a more complex cultural discourse than is commonly assumed, so was the discourse of high modernist planning as manifested in monumental

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<sup>4</sup> My description of the Marshall Plan is taken primarily from Hundley, *Great Thirst*, 232-56. For descriptions of earlier plans, see Donald Pisani, *From the Family Farm to Agribusiness: The Irrigation*

engineering works -- what I call "technological modernism" -- that underlay the grand(iose) construction projects of the 1930s. In a recent book, political scientist James C. Scott has argued that twentieth century bureaucratic planning and "high modernist ideology" have combined to create some of the world's most disastrous spatial reorganizations -- the city of Brasilia, mono-crop agriculture, Soviet collectivization, coerced "villagization" in Tanzania. Underlying all such plans, Scott maintains, has lain the desire to simplify and to control both nature and space in the interest of more effective bureaucratic administration. What distinguishes "high modernist ideology," according to Scott, is a strong, even radical, commitment to three ideas: continuing scientific and technological progress, the possibility of rationally designing the social order, and the necessity of ever greater control over both nature and human nature.<sup>5</sup> Scott offers a rich analysis and critique of high modernist planning in part because he acknowledges its frequently utopian premises.

But if one looks closely at the engineers "behind" the CVP and similar projects in the 1930s and early 1940s, some of Scott's generalizations about the desire and supreme self-confidence of elites in their ability to control both nature and human nature require modification. American engineers in the 1930s did not see their job as the reworking of society from a blank slate into a new rationalized form, but as the reinvigoration of particular nineteenth-century visions that the depression had brought into crisis -- in the

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*Crusade in California and the West, 1850-1931* (Berkeley: University of California Press, 1984), 381-439.

<sup>5</sup> James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 89-90.

case of the Central Valley, that vision was agrarianism. In other words, the CVP was not merely an elite ideology that was imposed on a random landscape; it arose from the intersection of modernist planning and the culture and history of the nineteenth-century western United States. Writing in 1937, recalling his inspiration for the project, Robert Marshall saw the CVP as the culmination, not the negation, of that nineteenth-century vision:

I saw the valley of California, a natural bluff canvas of endless beauty as far as the eye could see...an endless plain with not a house in sight. In my mind came the thought -- irrigation, alfalfa, farms, colonial houses, fruit trees and vines, happy laughing children, health, happiness, wealth, contentment -- a new world lay before me. I pledged my effort, that something must be done to reclaim those brown fields.... Thus, in November 1891, was born in my soul the reclamation of the Valley of California.<sup>6</sup>

While the agrarian rhetoric surrounding the project certainly served political ends, it is also true that the engineers and planners actually believed that they could serve agrarian goals. The depression had called the viability of American agriculture into question, but by incorporating agriculture into a larger vision, modernist thinkers, including Bureau planners, sought to find a place for rural life and agrarian ideals in twentieth-century America. In their own minds, a highly centralized, large-scale

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<sup>6</sup> Cited in Donald J. Pisani, *From the Family Farm to Agribusiness*, 394-95. When justifying the project to the public, the Bureau of Reclamation built explicitly upon Marshall's conception. In the publicity for the project, the CVP was portrayed as an attempt to "rescue" California agriculture and the agrarian dream

technological project was not at odds with democratic agrarianism. Thus, they celebrated the project's agrarian goals and its technological accomplishments simultaneously.<sup>7</sup> In the words of one official, reclamation eradicated "the blights of an artificial civilization" by helping people to remain on farms and in contact with the land; yet it was, at the same time, "uniquely adapted to the modern day with its machines, power...and demand for intelligent cooperation."<sup>8</sup>

Technological modernists, both cultural critics and engineers, saw technology not only as a means of reinvigorating agrarianism but, perhaps more radically, as a means of reintegrating human beings with nature. Properly utilized, science and technology offered the hope of restoring a balance between the two. In a characteristic expression of this belief, FDR told Congress in 1935, "Men and nature must work hand in hand. The throwing off balance of the resources of nature throws out of balance also the lives of men."<sup>9</sup> But perhaps the most elegant American exponent of technological modernism in the period was Lewis Mumford. In one of his most influential books, *Technics and Civilization*, Mumford wrote:

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from a critical shortage of water and the vagaries of nature. See the article entitled "Central Valley," in *Reclamation Era* 27 (April 1937), 80-81.

<sup>7</sup> For Mumford on agriculture, see *The Culture of Cities* (New York: Harcourt, Brace & Co., 1938), 340-42 and *Technics and Civilization*, 258-59. Although the engineers did not generally take up politics in their written correspondence, when attacked they defended their work as favoring the average farmer and generally redistributive. See U.S.B.R. "Annual Project History (CVP), 1946," 1:1:5-6, Acc. 8NN-115-90-011, RG 115, National Archives and Records Administration (NARA), Denver. For celebration of agrarian goals and technology, see Walker Young, "The Central Valley Project of California," *Reclamation Era* 28 (February, 1938), 22-25.

<sup>8</sup> Marshall N. Dana, "Reclamation and the Home," *Reclamation Era* 28 (June 1938), 106.

<sup>9</sup> Franklin D. Roosevelt, "Men and Nature Must Work Hand in Hand -- A Message to the Congress on the Use of Our Natural Resources," 24 January 1935, in *The Public Papers and Addresses of Franklin D. Roosevelt* (New York: Random House, 1938), 60-61.

Technics ha[s] become a creative force, carried on by its own momentum, ...rapidly ordering a new kind of environment and...producing a third estate midway between nature and the humane arts....It [is] not merely a quicker way of achieving old ends but an effective way of expressing new ends.<sup>10</sup>

Although obviously a proponent of technological advance, Mumford was not a naive technological optimist. To the contrary, he remained extremely critical of the social and environmental effects of nineteenth-century industrialization, which he labeled the "paleotechnic" age. As Mumford described it, modern planning was a response to the ugly, disordered landscapes created by unregulated capitalism. Mumford had lamented the ugly, polluted landscapes that were the result of early industrial technology, much as Jefferson before him had feared the potential for Europe's industrial towns to develop in America.<sup>11</sup> He argued that America needed not merely to accept the presence of the "machine" in modern life, but to work to turn it towards *human* purposes. In the place of industrial cities, Jefferson had proposed a nation of farmers, while, a century and a half later, Mumford proposed planned landscapes which carefully balanced agriculture, nature, and industry. While the machine was indeed remaking the modern world, if it were properly controlled, he argued, Americans could live in a landscape that balanced agriculture with industry, technology with nature.<sup>12</sup>

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<sup>10</sup> Mumford, *Technics and Civilization*, 322-23.

<sup>11</sup> Mumford, *Technics and Civilization*, 217.

<sup>12</sup> Mumford, *Technics and Civilization*, 298-99, 430-31.

To modernist eyes, the Central Valley was a site of such disorder, both natural and capitalist. Anglo settlers had been frustrated by the climate's variability and the rivers' irregularity since the mid-nineteenth century. To both farmers and engineers, it had long seemed obvious that water in the valley was poorly distributed and that the annual floods and overflows needed to be contained. And by the 1930s, Bureau engineers were also critical of the haphazard use that Americans had made of the landscape in their century of occupation -- ironically such criticisms echoed early Anglo criticisms of the region's Spanish and Mexican occupants. Bureau photo albums from 1936-37 are filled with shots of the mining-ravaged land around Kennett, California, the site selected for Shasta reservoir. In one photograph taken by Ben Glaha, the Bureau's chief photographer, mounds of old tailings stretch across the land, interrupted only by pools of muddy water that have collected in the depressions. The only sign of human habitation is a lone car parked in the foreground, presumably the photographer's. In the distance, a scraggly second-growth forest frames the scene. Clearly here is a landscape in need of renewal and restoration. Such images seem to echo nineteenth-century criticisms of mining as a short-term desecration of nature that would only leave California poorer in the long term. Paired alongside renderings of the proposed dam, the implication is clear: the engineers were repairing and improving a landscape that had been subject to uncontrolled exploitation.<sup>13</sup> Similarly, Bureau engineers echoed their predecessors'

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<sup>13</sup> Photographs K54-62, K66, K98, album 1, box 40, Acc. 115-86-006, RG 115, NARA, Denver; Walker R. Young, "Address on Central Valley Project before Tulare Chamber of Commerce," 13 January 1938, p. 6, Water Resources Control Archives (WRCA), Berkeley. Walker Young was the chief construction engineer on the CVP.

criticisms of both the valley's natural landscape and the uncoordinated works of irrigation and flood control undertaken by individuals and small groups. Ultimately these early capitalist and pioneer projects were not only technically inferior and visually offensive, but environmentally wasteful. In their place, the engineers sought to craft a more rational and orderly environment.<sup>14</sup>

Although engineers in the 1930s saw themselves as offering a new, more rationalized vision of the valley, the desire for an ordered landscape had much older roots. Nineteenth-century Californians, particularly engineers, had expressed similar desires, and Thomas Jefferson himself is credited with the early planning of the National Land Survey, which divided western lands into rectangular states, townships, and sections in order to facilitate settlement. For Jefferson, mathematical, rational measure was the tool through which the moral and democratic goals of the new nation could be achieved.<sup>15</sup> Thus modernist planning marked not a departure from earlier ideas so much as their more complete realization.

Part of what enabled engineers to further the ordering of the landscape was their ability to view and map it from the air. As the geographer Denis Cosgrove has pointed out, modernist planners and architects have been captivated by the view-from-above.<sup>16</sup>

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<sup>14</sup> Photograph SJ-1 (Herminghaus lands), album 1, box 40, Acc. 115-86-006, RG 115, NARA, Denver. The caption to this photograph reads in part, "They are irrigated simply by flooding direct from the river or its tributary sloughs. Water is turned over the land and checked upon contour. This is perhaps the ultimate in wasteful methods of irrigation...."

<sup>15</sup> Hildegard B. Johnson, *Order Upon the Land: The U.S. Rectangular Land Survey and the Upper Missouri Country* (New York: Oxford University Press, 1976).

<sup>16</sup> Denis Cosgrove, "The Measures of America," in James Corner and Alex S. MacLean, *Taking Measures Across the American Landscape* (New Haven: Yale University Press, 1996), 3-13.

Although aerial views had been imagined and drawn for hundreds of years, they have become a reality only in the twentieth century with the arrival of first the airplane, then satellites and spacecraft. Such technologies have themselves enabled grander visions. In essence, they created a new spatial imaginary, or at least made such an imaginary more accessible. In 1935, Le Corbusier, perhaps the quintessential representative of high modernist planning, published a book entitled *Aircraft*. In this volume, he described the significance of the new aerial view in exaggerated terms:

The eye now sees in substance what the mind could only subjectively conceive; [the view from the air] is a new function added to our senses; it is a new standard of measurement; it is the basis of a new sensation. Man will make use of it to conceive of new aims. Cities will arise out of their ashes.<sup>17</sup>

The planning of the CVP did, in fact, coincide with the increasing use of aerial photography, and project engineers made extensive use of this new visual technology. In the mid-1930s, these photographs offered an entirely new view of the valley. Bureau of Reclamation documents are filled with aerial views of the landscape, plan drawings, and photographs of scale models. The engineers mapped the valley in plan, as if they were suspended above it, creating views of the region that could never actually be seen. There is, after all, no other way of visualizing and assimilating the impact of such a large-scale

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<sup>17</sup> Quoted in Corner and MacLean, *Taking Measures Across the American Landscape*, 15.

project.<sup>18</sup> And from this perspective, the engineers' plans made eminent sense. They saw potential connections, and the alternative, more sensible routes that rivers might follow. Moreover, at this scale, troubling details like salmon spawning areas and property ownership fell out of the picture. The aerial view seemingly erased many of the social and environmental complications, allowing engineers the freedom to imagine even grander plans. From the air, the Central Valley appeared as a single region, rather than three distinct watersheds. Thus the problem became less one of redistributing water from one region to another, but of efficiently managing the entire valley as a larger whole. The aerial view provided additional impetus for perceiving the valley as a single region that required centralized management. Accordingly, the project successfully collapsed what had previously seemed insurmountable spatial barriers. Moreover, such a view encouraged engineers and planners to focus on the landscape's sculptural properties and visual order. The engineers would have agreed with contemporary geographer James Corner that "from the air...it is features of nature that seem out of place."<sup>19</sup> In other words, rivers, it became obvious, were in the wrong locations. To attain the idealized modern landscape, natural features would have to be self-consciously manipulated.

In contrast, if we return to Robert Marshall's vision, it is significant that, despite the fact that he was a topographer -- and thus accustomed to imagining the landscape in abstract ways -- he still envisioned himself, at least at moments, as part of the landscape. In fact, Marshall owned a farm in the valley himself for many years. When talking about

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<sup>18</sup> Scott, *Seeing Like a State*, 58.

<sup>19</sup> Corner and MacLean, *Taking Measures Across the American Landscape*, 77.

brown fields, colonial houses, and happy children, he was viewing the landscape from ground level. These are the details that fell outside of the Bureau engineers' picture. As a vision, agrarianism adopted the perspective of individual farmers. It was situated on the land, and its scale was human. It envisioned farmers picking fruit and pruning vines. From the engineers' perspective, however, the perfect agrarian landscape had come to resemble a Mondrian painting: well-defined, orderly blocks of different colors spreading across the land, with every space carefully accounted for and nothing gone to waste.<sup>20</sup> This is most obvious in the Bureau's own aerial photographs, which have their own rhythm and beauty. Typically such photos show differentiated fields of different shapes and sizes, a geometry of agriculture, through which well-placed irrigation canals sinuously slide. The aerial view helped to redefine the aesthetics of agrarianism in strikingly modernist terms.

It is tempting to argue that this technology served to further distance the engineers and planners from the environment they were reconstructing, that to view the valley as a juxtaposition of agricultural spaces and waterways ignored the environmental realities of the region: salmon, soil quality, and riparian habitat, to name but a few. And of course it did. But at the same time, engineers and others tended to view technology as a means of better apprehending nature, of understanding natural realities more thoroughly than ever before. They felt their own technologies more fully revealed nature and nature's intentions in the valley, much as agrarians had viewed the planting of fruit trees as a

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<sup>20</sup> This reflects, in part, the fascination held by modernist planners for the aerial view. See Cosgrove, "The Measures of America," 10.

revelation of the region's natural and social potential. In this way, the effects of technology on the human relationship to nature were always ambiguous. Understandings were both gained and lost.

What characterized modernist aspirations was not the desire for order, which agrarians had also shared, but the extent and precision of their vision. In the 1930s, modernists had at their disposal large-scale technology, more sophisticated science, and the resources of the federal state.<sup>21</sup> Consequently the CVP reorganized space and nature in the valley with an unprecedented thoroughness. Not only would the land be neatly sectioned, but the variability of the rivers would be controlled and their water more equitably distributed. In essence, they extended to entire river systems the initial agrarian concern with the orderly distribution of land. There would be no wet season and no dry, no years of flooding and no years of drought. Each day, each year, would be like the next. Whereas William Cronon has used the term "second nature" to refer to the rural landscape created by nineteenth-century capitalism, "third nature" might better describe the new technological landscape created by the CVP.<sup>22</sup>

What made this a landscape of "third," rather than second nature? It was, first of all, a landscape crafted primarily by the state rather than by the operation of the market. It was precisely the inability of the market to solve California's water problems that had prompted calls for state intervention since the 1870s. As engineers and others understood

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<sup>21</sup> They also had the crisis of the Depression, which allowed the state to assume even greater powers. Scott, *Seeing Like A State*, 97.

<sup>22</sup> William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: Norton, 1991), 266-67.

it, the market worked against the rationalization of the landscape. Precisely because the environment could never be fully segregated into discrete commodity units, state intervention and state control were essential. The Central Valley Project was too complex and too expensive to be undertaken by any other entity. And to the extent that they both “thought” in spatial or territorial terms, engineers and the state were natural allies. One of the principal objectives of the state is to name and to control space. The state must both create and define its territory. As Deleuze and Guattari describe it, this is a process of “capturing flows,” of population, commodities, and capital.<sup>23</sup> In the case of the CVP, Deleuze and Guattari’s metaphor becomes literal. Whereas “territory” generally connotes land, the large-scale irrigation projects sought to extend state control to water, an inherently more difficult task. Engineers sought to capture and redirect the flows of rivers, and to exercise that control from a distance.

A further difference between nineteenth-century capitalist and twentieth-century modernist transformations in the Central Valley was that in the former the state had furthered environmental transformation by encouraging the region's privatization, while the latter required that the state gain direct control over space. Because of their scope, modernist transformations typically require more strongly centralized organization. And engineers and planners agreed that individual property ownership, and more particularly individual control of water, had contributed to the landscape’s disorder, and consequently

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<sup>23</sup> Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (Minneapolis: University of Minnesota Press, 1987), 385. My attention was drawn to this observation by Frieda Knobloch in her book, *The Culture of Wilderness: Agriculture as Colonization in the American West* (Chapel Hill: University of North Carolina Press, 1996), 23.

had to be abrogated or at least modified in the interest of a more rational organization. And, in fact, the greatest hurdle to implementing the CVP was the challenge that it raised for existing property arrangements. The water in the rivers was, to a large extent, already “owned” by individuals and corporations. The federal government had to negotiate rights to that water in order to impound it, and also to secure the rights-of-way for reservoirs, canals, and electric transmission lines.

One effect of such centralized control was to shift the temporal scale at which these changes were conducted. The engineers had envisioned the details of a reordered nature, and they would produce their vision as reality in less than 15 years -- not through the chaotic operations of the market, but through systematic government planning. The CVP was not the summation of many small, individual decisions of how to alter the environment, but the result of a professionally controlled planning process and a few over-arching decisions.

The discourse of modern engineering both echoed and irrevocably altered the agrarian discourse of finishing. While from a contemporary perspective engineers, particularly hydraulic engineers, are generally seen as complicitous in -- if not responsible for -- the destruction of the Central Valley landscape, engineers of the 1930s did not see themselves simply in opposition to the non-human world. Rather, like their nineteenth-century forbears, they saw themselves as mediators between nature and human society, as stewards, as the individuals most capable of truly understanding

nature.<sup>24</sup> Engineers thought that their own virtue arose from their commitment to an objective, scientific methodology that allowed them to uncover and to understand natural laws. They prided themselves on their intricate knowledge of the landscape: the details of its geology, the variation of streamflow, its climatic history. There is a parallel here with nineteenth-century agrarians, in that for both agrarians and engineers, virtue arose through contact with the natural world. It was the ability to understand nature's secrets -- whether how to generate hybrid fruits or how to measure streamflow -- that contributed to human development. Engineers, like nineteenth-century horticulturists, sought to render nature more regular and reliable. Nature required improvement and finishing so that its ultimate potential could be realized.

From such a perspective, the Central Valley clearly did not work. As the Bureau and others liked to point out, the soil was incredibly fertile and the climate unparalleled, yet the water was “maldistributed.”<sup>25</sup> Nature had created a perfect agricultural setting, yet had failed to provide adequate water in the right places to grow crops.<sup>26</sup> The engineers did not denigrate nature as “irrational,” but merely as incomplete. Here they invoked the familiar language of finishing and mimesis, pushing it to sometimes absurd

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<sup>24</sup> William F. Durand, “Why the Engineer?,” *Civil Engineering* 6 (November 1936), 780. This article was a reprint of a lecture given at the “Third World Power Conference”; it was widely excerpted and reprinted in contemporary engineering publications, which suggests its resonance in the profession. See, for example, *Reclamation Era* 27 (February 1937), 40; *Electrical Engineering*, 55 (December 1936), 1301-03. See also, U.S.B.R., “Shasta Dam 602 Feet High,” 4 December 1941, box 165, Entry 7, WDC, RG 115, NARA, Denver. Also, John C. Page, “The Engineer Plus,” *Reclamation Era* 28 (May 1938).

<sup>25</sup> Walker Young, “The Central Valley Project of California,” *Reclamation Era* 28 (February, 1938), 23; “Shasta Dam 602 Feet High,” USBR Press Release, 4 December 1941, box 165, Entry 7, WDC, RG 115, NARA, Denver.

lengths. The dams, canals, and pumping plants of the CVP would not obliterate but would perfect and supplement nature in the Central Valley. They would create, in Richard White's phrase, an organic machine, a blend of nature and culture, a modernist paradise.<sup>27</sup> As one writer remarked, capturing perfectly the engineers' perspective, "From the air, Shasta Reservoir will look like a silver maple leaf set amid mountains."<sup>28</sup> This formulation not only adopts an aerial view, it naturalizes technological intervention, glibly comparing a massive concrete dam and reservoir to a fallen leaf. From this perspective, technology and nature could be combined to create a new hybrid landscape. As one leading engineer described his profession in 1939, "It is the link, the bridge, between man and nature, the bridge over which man passes to get into nature to control it, to guide it, to understand it, and the bridge over which nature and its forces pass to get into man's field of interest and service."<sup>29</sup>

There is perhaps a contemporary tendency to see the Central Valley Project as the antithesis of "nature" simply because it seems so patently man-made, a rationalist dream of concrete that has obliterated wetlands, vernal pools, and salmon habitat. The pejorative metaphor that critics engage is that of the "plumbing project."<sup>30</sup> But such a

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<sup>26</sup> Walker Young, "Paper on Central Valley Project before the Los Angeles Section of ASCE," 9 February 1938, WRCA, Berkeley; Seth H. Dibble, "Why Not Irrigation?" *Reclamation Era* 26 (November 1936), 253.

<sup>27</sup> Richard White, *The Organic Machine: The Making and Unmaking of the Columbia River* (New York, Hill and Wang, 1995).

<sup>28</sup> Magner White, "We're Moving the Rain," *Saturday Evening Post*, 27 April 1940, p. 38.

<sup>29</sup> S.B. Morris, "Engineering," 27 November 1939, folder 95, Samuel B. Morris Papers, Huntington Library, San Marino, CA.

<sup>30</sup> Mark Fiege, *Irrigated Eden: The Making of An Irrigated Landscape in the American West* (Seattle: University of Washington Press, 1999), 7.

reading imposes contemporary environmental aesthetics onto projects that were conceived in a different cultural moment. For engineers and others in the 1930s, large dams and concrete channels echoed the natural landscape even as they transformed it. Moreover, modern engineering offered an aesthetic as well as a pragmatic vision of the valley.<sup>31</sup> The dams and powerhouses were intended both to complement the natural landscape and to be beautiful in their own right. This aesthetic self-consciousness was reflected in the engineers' attention to seemingly trivial details, such as mixing the cement to achieve a uniform color and cleaning the face of the dams upon the completion of construction.<sup>32</sup> The Bureau also hired a modernist architect, Gordon Kaufmann, to consult on all of their major concrete dams. And the engineers were always seemingly anxious to solicit Kaufmann's aesthetic input. In the modernist terms of the 1930s, beauty arose from pure function; accordingly, Kaufmann strove to simplify the design of Shasta Dam and other hydraulic structures, to express their functionality without needless ornamentation. By all accounts, the engineers appreciated his aesthetic sensibility.<sup>33</sup>

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<sup>31</sup> Both intellectuals and lay people did perceive the work as significant. For instance, the artist Hugh Ferriss visited and drew the three major concrete dams of the era. For his rendering and comments on Shasta, see Hugh Ferriss, *Power in Buildings: An Artist's View of Contemporary Architecture* (New York: Columbia University Press, 1953), plates 7-8. The significance that lay people attached to the dams can be partially inferred from their popularity as tourist sites, both during and after construction.

<sup>32</sup>For mixing cement, see Andrew J. Dunbar, and Dennis McBride, *Building Hoover Dam: An Oral History of the Great Depression* (New York: Twayne Publishers, 1991), 167-68. For cleaning of dam, see U.S. Bureau of Reclamation, "Annual Project History," 1942, 3:19, Acc. 8NN-115-90-011, RG 115, NARA, Denver.

<sup>33</sup> For information on Kaufmann's own history and involvement in Hoover Dam, see Richard Guy Wilson, "Machine-Age Iconography in the American West: The Design of Hoover Dam," *Pacific Historical Review* 54 (November, 1985), 463-493. For Kaufmann's involvement on Shasta Dam, see, for instance, Letter from G.B. Kaufmann to S.O. Harper, 26 June 1941, box 294, Acc 115-54-A-81, RG 115, NARA, Denver; Letter from Chief Electrical and Mechanical Engineer to G.B. Kaufmann, *ibid.* For additional evidence of the engineers' interest in modernist architectural designs, see "Annual Project Report," 1944, 4:1:26, box 12, Acc. 8NN-115-90-011, RG 115, NARA, Denver; "Annual Project Report," 1945, 4:2:18, *ibid.*

Bureau photographer Ben Glaha similarly noted that his own conception of beauty derived from his experience as an engineering draftsman. As he wrote, "Whatever beauty [engineering drawings] possess is not the result of superficial ornamentation of the drawing itself nor is it the beauty of the thing represented. Rather it is the beauty of precision, the beauty that becomes evident when nonessentials are stripped away -- in other words, the beauty of pure function."<sup>34</sup> In a similar vein, the project engineers devised alternative, more functional, and therefore more beautiful, routes that rivers might follow. When they drew their reservoirs and canals on paper, they appeared as well-placed lakes and streams.<sup>35</sup> As they described it, Shasta Dam would be "as much a part of the landscape as Mount Shasta which overlooks it."<sup>36</sup> In other words, engineering designs were conceived not with a disregard for their impact on the landscape, but with a desire to complete the natural landscape and a modernist aesthetic sense.

The Bureau's photographic archive visually reproduces this language of finishing by suggesting again and again that the projects belong in the landscape. Panoramas of the dams, for instance, are strikingly beautiful, even to contemporary eyes. The colors and texture of the concrete echo that of the clouds, blurring the boundary between the man-made and the natural. While the dams seem impressive, they are not typically portrayed as overpowering. Instead they are integrated into a larger landscape: river in

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<sup>34</sup> Cited in Barbara Ann Vilander, "The Hoover Dam Photographs of Ben Glaha Completed Under the Auspices of the United States Bureau of Reclamation" ( Ph.D. diss., U.C. Santa Barbara, 1995), 93.

<sup>35</sup> See for instance "Annual Project History: Central Valley Project," 1937, pp. 46, 50, 64, Acc. 8NN-115-90-011, RG 115, NARA, Denver.

<sup>36</sup> William Warne, "Draft of remarks in connection with the starting of Shasta generator," box 117, file 090.20, Entry 7, Projects--CVP, RG 115, NARA, Denver.

the foreground, mountains and sky in the background.<sup>37</sup> Technology is at once foregrounded and assimilated into nature.

In other shots, the photographer utilizes the conventions of nineteenth-century pastoral painting to emphasize the unity between technology and nature. For instance, Ben Glaha's photograph of Contra Costa Canal is taken from a hillside; we look down on a bucolic scene. The gently winding canal leads the viewer's eye through an agrarian landscape to a resting point in the hills beyond. In the middle ground of the photograph, a wooden pedestrian bridge crosses the canal; a wooden barn with steep-sloped roof occupies a pasture; and a lone sheep grazes.<sup>38</sup> Here elements of an older agrarian world (wood construction, a single sheep) tame and envelop modern engineering. Looking at this photograph, it is impossible to view the canal as a technological intrusion. Instead, it complements and completes the scene.

Yet even while engineers sought to renew and preserve agrarianism through their work, they unwittingly rendered agrarianism hopelessly inadequate and antiquated as a cultural narrative. Most importantly, engineers, not farmers, were the agents of this new vision. Agrarian ideology had placed the task of finishing the landscape in the hands of individual farmers; yet under the emerging vision of the valley, while farmers might have a necessary role to play, they were no longer the agents of history. Farmers would not be

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<sup>37</sup> Photograph WO K-4170-DV-KD-SD, album 11, box 45, Acc. 115-86-006, RG 115, NARA, Denver; Photograph WO K3619-CV-KD-SD, album 10, box 45, *ibid.*; U.S.B.R., "Annual Report – Central Valley Project," 1942, box 12, Acc. 8NN-90-011, RG 115, NARA, Denver.

<sup>38</sup> The photograph appears in "Annual Project Report," 1944, 4:3:2, box 14, Acc. 8NN-115-90-011, RG 115, NARA, Denver. On the pastoral form in American painting, see Barbara Novak, *Nature and Culture: American Landscape and Painting, 1825-1875* (New York: Oxford University Press, 1980).

the source of republican virtue and American prosperity so much as the beneficiaries of industrial and technological change. As one engineer noted, in response to the criticism of Western dam projects, "It must be remembered that the West is in a much less advanced stage of engineering development than the East and that much more real building is necessary for its immediate development."<sup>39</sup> While seemingly a mundane statement, this formulation takes for granted the belief that the progress of civilization is consonant not with the spread of agriculture, but with the development of technology. Whereas agrarianism linked civilization with cultivation to elaborate an agricultural hierarchy, technological modernism linked civilization with engineering projects. Unwittingly drawing this very agricultural analogy, one engineer declared, "True civilization is dependent on the fruits of engineering."<sup>40</sup> It was engineering, not agriculture, that reproduced culture.

Accordingly, engineers adopted a view of history in which what counted as history were attempts to reshape space through the application of technology. It was technology, rather than nature, that now legitimated one's occupation of a given landscape. This echoed Mumford's contention that the type of technology dictated the

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<sup>39</sup> John P. Hogan, "Letter to the Editor," *Civil Engineering* 5 (February 1935). See also the quote from *The Building of Boulder Dam: An Engineering Triumph* (1939) cited in Vilander, "The Hoover Dam Photographs," 155-56.

<sup>40</sup> D.C. Jackson, *Engineering's Part in the Development of Civilization* (New York: American Society of Mechanical Engineers, 1939), 14.

character of each historical age.<sup>41</sup> Technology, rather than environment or race, became the variable that explained cultural development and economic progress.<sup>42</sup>

The engineers capsulized the Valley's history into three phases, and in each phase what pushed history forward was technology. The first phase was that of the desert, in which the valley was inhabited by Indians who lacked any technology to speak of. The result was their complete dependence upon environmental conditions and an inability to develop anything but the most rudimentary forms of culture. The Spaniards, although familiar with the valley, could not see its potential and therefore "left" it to the technologically bereft Indians. At this point, the valley still lay outside of history, a space lacking technological development and therefore essentially empty and timeless. The second stage of history was wheat farming which was made possible by the "crude utilization of the unregulated flow of the rivers." This approach left farmers vulnerable to both droughts and floods; and, while a temporary improvement on the landscape that was antecedent, the irregularity of weather and streamflow prohibited the development of a stable rural culture. The third phase was that of intensive irrigated agriculture, which had begun with numerous local efforts and which the Bureau was striving to further through its own enormous water projects. The valley's history was defined by the

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<sup>41</sup> Mumford, *Technics and Civilization*, 109.

<sup>42</sup> Michael Adas has argued that ideologies of technological superiority have been much more important than those of racial superiority throughout the eighteenth and early nineteenth centuries. Adas criticizes the scholarship for focusing racism as *the* principal theme in European intellectual discourse on non-Western peoples. Adas, however, makes a partial exception for the late nineteenth-century, when theories of scientific racism were at their peak. Michael Adas, *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance* (Ithaca, NY: Cornell University Press, 1989).

evolution of its technology: first the technology of agriculture and run-of-the-river irrigation, and, subsequently, the technology of intensive irrigation.

But it was only the latter phase, that ushered in by modern engineering, that offered the hope of real progress.<sup>43</sup> What differentiated modern technology from its predecessors and primitive antecedents was its perceived permanency, its ability to withstand natural conditions. The engineers took as their reference point the great ruins of antiquity -- the pyramids, the Roman aqueducts, the Parthenon. They intended the dams and powerhouses to stand as monuments to the modern civilization that was emerging in the Western United States and to be unearthed and admired centuries hence. Observers compared Shasta favorably to the still-standing pyramids of the ancient Meso-American Indians.<sup>44</sup> Frank Crowe, the contractor's construction engineer on Shasta, claimed that the dam "will stand there forever." Meanwhile, a popular magazine article noted with some hyperbole that concrete dams would "outlast natural mountains of stone."<sup>45</sup> Engineers dismissed or ignored critics who raised issues such as the siltation of reservoirs -- the continuing building up of sand and silt behind the dams that would eventually impair their operation -- confident that they had rendered these natural processes irrelevant.

Engineers, in essence, participated in a rewriting of the older agrarian and racial script in technological terms. What now differentiated Anglo-American occupation of

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<sup>43</sup> Young, "The Central Valley Project of California," 22.

<sup>44</sup> Ferriss, *Power in Buildings*, plates 7-8.

<sup>45</sup> "By a Damsite," *Time*, 19 June 1944, p. 79; "Decade of the Dam Builders," *Popular Mechanics*, August 1942, p. 40.

the valley from what had gone before was their *technological*, rather than agricultural, adaptation of the environment. Of course, technology still correlated with race, but this was merely fortuitous rather than biologically determined. As the president of the American Society of Civil Engineers noted in 1939, while the American westward migration had been completed, "The engineer has not yet reached his frontier nor has he even come in sight of it."<sup>46</sup> Technological advance had replaced manifest destiny and Anglo-American agriculture as the measure of progress.

It was not that the older racial thinking had been suddenly abandoned, but merely modified. The human ability to modify the environment offered the potential to begin to decouple environment and race. As the landscape planners Garrett Eckbo, Dan Kiley, and James Rose wrote in 1939, "man" had realized that "the 'natural' environment is seldom the best for the optimum development of desirable human, plant, animal, or insect species."<sup>47</sup> It was no longer the natural environment or the act of laboring that transformed men, so much as the natural-technological environment that they created. Environments required intervention and adaptation so that they might produce the most desirable kinds of human beings.

It was critical, however, that the technological reworking of the environment be most closely associated with white men. As the *New York Times* reported, invoking

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<sup>46</sup> Donald H. Sawyer, "Frontiers of Engineering," *Civil Engineering* 9 (August 1939), 457.

<sup>47</sup> Garrett Eckbo, Daniel U. Kiley, and James C. Rose, "Landscape Design in the Primeval Environment," *Architectural Record* 87 (February 1940), 79.

familiar racial thinking, many had been concerned that environmental conditions at Boulder Dam might necessitate a reliance on non-white labor:

The spot picked by nature for Hoover Dam is at the centre of one of the most furious sectors of the great American heat belt; at the same time, the government felt it desirable to limit the employment list as nearly as possible to white American citizens. It has before it thus, the task of keeping 3,000 or so more Americans, mainly of the native and Northern European stocks, contented and healthy at hard labor jobs on which three months of the year they must often face temperatures above 120....Anything like a general health break-down among the 'help' would mean, of course, serious interruption in the work and no doubt eventually the importation of foreign tropical labor to finish the job with its implied confession that within continental United States a task had been found too difficult for American physique and morale to accomplish.<sup>48</sup>

As this author implies, the "continental United States" was the domain of white Americans, and yet if they were to lay proper claim to that landscape, white Americans would also have to be the ones to transform, adapt, and finish it.

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<sup>48</sup>Duncan Aikman, "A Wild West Town that is Born Tame," *New York Times Magazine*, 26 July 1931, pp. 6-7. Walker Young, construction engineer for both Boulder and Shasta dams argued that climatic conditions favored the use of Mexican workers on the projects. Similarly, the construction contractor for Boulder Dam, Six Companies, Inc., argued that African-Americans should not be employed on the project even though they "would probably be desirable on account of the extreme heat...." In this account, environment still conditioned bodies, which in turn shaped the social realities of labor. Even as they strove to remake nature, they acknowledged the ways in which nature conditioned the bodies of men. Letter from John C. Page to the Commissioner, 27 July 1931, RG 115, NARA, Denver, cited in Barbara Ann Vilander, *Hoover Dam: The Photographs of Ben Glaha* (Tucson: University of Arizona Press, 1999), 100.

But the relationship between technology and bodies was not merely one of racialized association. The growing preponderance of technology in American life raised more complicated issues about the identity of even white men who labored amidst ever more impressive machines. Among intellectuals of the period, a common response was to emphasize the integration of human beings with industrial machines and technology, much as engineers emphasized the integration of dams with nature. As engineers blurred the boundaries between technology and the natural environment, many critics and artists delighted in blurring the boundaries between technology and human bodies. Mumford, for instance, referred to the body as a “microcosm” of the machine: the arms were levers; lungs were bellows; the nerves were a telegraph system connected to a central station.<sup>49</sup> The reverse was also asserted: technology was human. Mumford saw good engineering as fundamentally organic despite its monumentalism. He argued that the best technological design reiterated organic forms and that eventually the complete assimilation of the machine would lead humankind *back* to the organic, that the future would see a new era which he optimistically described as the “biotechnic.”

Such thinking was evident not only in the criticism of Mumford, but also in the work of visual artists who took technology as their subject. For example, commenting on the work of the artist Charles Sheeler in 1940, *Fortune Magazine* said the following:

He shows [power machines] for what they truly are: not strange, inhuman masses of material, but exquisite manifestations of human reason. As the

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<sup>49</sup> Mumford, *Technics and Civilization*, 32.

artists of the Renaissance reflected life by picturing the human body, so the modern American artist reflects life through forms such as these; forms that are more deeply human than the muscles of a torso because they trace the firm pattern of the human mind as it seeks to use co-operatively the limitless power of nature.<sup>50</sup>

This description naturalizes technology by emphasizing its human origins. Technology is not posed against human beings; it reflects and also absorbs them. At its best, technology is more human than the body itself. This stance echoes the enlightenment position of Thomas Jefferson, who linked human beings and nature through their analogical rationality; human nature and external nature were mirrors of one another. But unlike Jefferson, Sheeler and other intellectuals of the 1930s foregrounded the technological rather than the natural. Human beings were mirrored equally if not more closely in technology and machines than they were in the natural world. Technology might absorb and reflect human beings as it reflected and absorbed nature.

Within the Bureau of Reclamation itself there is evidence of this insistence on the complementarity of men and machines. On the one hand, Bureau photographs of workers participate in what historian Barbara Melosh calls the era's "preoccupation with masculinity."<sup>51</sup> It is not just the complete absence of women from the photographic

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<sup>50</sup> "Power: A Portfolio by Charles Sheeler," *Fortune*, December 1940, p. 73. This portfolio includes, among other things, a painting of both a hydroelectric turbine and an electric transmission tower at Boulder Dam. Sheeler, in fact, was directly inspired by the dam projects of the 1930s. He visited Boulder Dam several times, taking photographs which he later used as studies for paintings. In a noteworthy instance of potentially reciprocal influence, Bureau photographer Glaha was an ardent admirer of Sheeler's work. See Vilander, *Hoover Dam*, 55-56, 66.

<sup>51</sup> Barbara Melosh, *Engendering Culture: Manhood and Womanhood in New Deal Public Art and Theater* (Washington: Smithsonian Institution Press, 1991), 87.

archive (with the occasional exception of a photo of the office or hospital staff), but that the photographs themselves seem intent on communicating messages about manhood. But they suggest not merely the value of male labor, but more insistently that men are associated with machines. In one photo, five men sit inside a giant turbine casing, while one places a pipe. The others casually watch in relaxed poses. These men display a comfort with something that to outsiders seems strange, incomprehensible. But *they* understand this technology and actively work with it. Moreover, the scene is located indoors. There is no sign of "nature," no evidence of hard, outdoor labor. The photograph communicates their masculinity solely through their proximity to (large) machinery and technology.<sup>52</sup> This seems perhaps too obvious to require comment. But, in fact, it represents a significant shift from the late nineteenth and even early twentieth century, during which most definitions of masculinity still emphasized the relationship between men and nature. Certainly this was true in the nineteenth-century agrarian discourse of labor. It was the close association with nature that developed, in Reverend Dille's words, "the most sterling qualities of manhood."<sup>53</sup> It was not that nature no longer played any role -- the harsh and dramatic natural settings of the Bureau projects were no small part of their larger significance. But in Bureau photos, and in New Deal art more generally, manhood is most typically associated with the integration of nature and

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<sup>52</sup> Photo 4300-CVP-KD-SD, album 11, box 45, Acc. 115-86-006, RG 115, NARA, Denver.

<sup>53</sup> E.R. Dille, "Man's Sovereignty Over Nature," California State Agricultural Society, *Transactions 1881*, p. 31.

technology, and it is the (male) relationship with technology that is beginning to take precedence.

The effort to associate technology and masculinity was, at one level, defensive. Concerns over the impacts of technology, particularly its negative effect on employment, were widespread in the period. Some observers expressed concerns that Americans were ushering in an era in which the technological creations of men might exceed their ability to contain and fully control them. Such concerns had emerged in the popular press, often in relation to the Bureau's own projects. For instance, an article in the *New York Times Magazine* drew particular attention to the seeming insignificance of the workers in comparison to the Boulder Dam:

The machines look so huge and so intelligent, the men so small and unimportant — little black specks that rush about on meaningless errands, in constant danger of being wiped out of existence as casually as one crushes an ant....They swarm on the dam top, dwarfed by every single implement they handle and rendered infinitesimal by the thing they build.<sup>54</sup>

Much of the Bureau's photographic archive seems to respond to just such concerns, alluding, like the editors of *Fortune* magazine, to technology's human origins. To the extent that technology was perceived not as an independent entity but as a product of human labor, it could also be popularly celebrated. For instance, one image that

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<sup>54</sup> Mildred Adams, "Taming the Untamable at Boulder Dam," *New York Times Magazine*, 24 February 1935, pp. 5, 19.

reappears several times in the archive is that of a man standing near a seemingly gigantic object or piece of machinery. A particular image taken at Shasta shows two sections of scroll casing on flatcars with a man standing directly in front of them. The diameter of the scroll cases is at least twice the height of the man. The framing of the photograph emphasizes the size differential between man and object. But the image does not suggest that the man is dwarfed or in any sense overpowered by the machinery. He has adopted a casual pose (a standard trope in these photos), and the sun is shining on him. Clearly he and his coworkers built these casings and will put them in place, with the aid of another equally impressive piece of machinery.<sup>55</sup> The photograph tells us that the origins of technology are human; and human beings (at least men) remain in control. Moreover, it suggests the comfortable, almost intimate, relationship between men and machines.<sup>56</sup>

Manly work and masculinity are clearly part of the Bureau's story, but the message generated by the Bureau photography of the dam projects is more complex. While the majority of the images focus on the landscape in some way, a significant minority do single out male workers as subjects in themselves.<sup>57</sup> It is difficult to argue

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<sup>55</sup> Photo W.O. No. 4300-CVP-KD-SD, album 11, box 45, Acc. 115-86-006, RG 115, NARA, Denver.

<sup>56</sup> With respect to the artistic representations of another New Deal dam project, the Tennessee Valley Authority (TVA), Barbara Melosh has argued that the government-sponsored artwork on the project "subordinated the massive constructions of the TVA to the familiar image of manly work....The dams were triumphs of human labor and of social, not mechanical engineering." Melosh, *Engendering Culture*, 122.

<sup>57</sup> Contemporary scholars have criticized certain photographs of the period for aestheticizing technology and erasing labor. This has been particularly true for the work of Margaret Bourke-White whose work exploited the lines, angles, and forms of the industrial landscape to produce beautiful and popular images; images, however, that were typically devoid of human beings. Similar criticisms could be leveled at those Bureau photographs that illustrate the beauty of the dams and the construction site without including, or least without foregrounding, the element of human labor. But such a criticism can be directed only at part of the Bureau's photographic archive. See Vicki Goldberg, *Margaret Bourke-White: A Biography* (New York: Harper and Row, 1986), 88; Melosh, *Engendering Culture*, 121-22.

that the dams or engineering more generally were always (or ever) subordinated to the male body. Rather the photographs suggest a synergism: men who work with technology easily, comfortably, men who derive their masculinity from their relationship to technology as much or more than through their relationship to nature.

Overall the Bureau's collection of images suggests that the agency's rhetorical approach to technology was two-pronged. On the one hand, they routinely connected technology to the landscape, reinvigorating a much older notion of agrarian finishing in which technology was naturalized as part of an ongoing effort to realize nature's incomplete designs. On the other hand, they emphasized technology as an outgrowth of the human, drawing on the rhetoric of organicism and integration that was dominant in the interwar period -- in these photographs, technology and men intermingle harmoniously.<sup>58</sup> Yet in both cases, the role of technology is central. Technology replaces both nature and agriculture as the focal point for the Bureau's, and the engineering profession's, definition of American identity.

Such a shift has potentially large ramifications. It is not simply men that come be associated with technology rather than nature, but that technology is now portrayed as the source of culture and "progress" more generally. Whereas in the nineteenth-century world, it was the environment itself (and the corresponding racial adaptability of human

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<sup>58</sup> For discussions of organicism see, S.J. Cross and W.R. Albury, "Walter B. Cannon, L.J. Henderson, and the Organic Analogy between the Wars," *Osiris* 3 (1987), 165-92. For a primary source, see William F. Ogburn, *Social Change with Respect to Culture and Original Nature* (New York: B.W. Huebsch, 1922); William F. Ogburn, *Living with Machines* (Chicago: American Library Association, 1933); Walter B. Cannon, "Biocracy: Does the Human Body Contain the Secret of Economic Stabilization?" *Technology Review* 35 (1935), 203-206, 227.

beings) that conditioned possibilities, such thinking had largely given way by the 1930s. Even though engineers saw their own projects as continuous with that of their agrarian predecessors, the centrality of technology to their plans and to their daily lives changed the cultural equations. As I have been suggesting, to say that they were simply using technology to "dominate" nature -- with the implication that the impulse towards domination is a quasi-essential and unchanging human characteristic -- fails to capture both the history and the complexity of a cultural shift that they themselves did not fully understand. Technology had not simply replaced nature as the source of white, male identity; engineers had mingled technology with nature and had begun to redefine nature as a result. In the process, they had also mingled technology with men.

Because it was the labor of human beings that poured the concrete, the engineers had to confront the relationship between men and technology not merely in aesthetic or intellectual terms, but also in practical ways. Large-scale engineering required the marshalling of both bodies and machines on an unprecedented scale. Begun in the midst of the Depression, the Central Valley Project drew thousands of people in search of work to Northern California. Those who obtained jobs on the dams would find their own bodies structured by the economies and requirements of large-scale and technologically sophisticated construction work. The creation of an engineered landscape both demanded and created new forms of labor. Constructions of space were linked to constructions of (laboring) bodies.

The construction of the CVP, like the construction of both Boulder and Grand Coulee dams, demanded a hierarchically organized and tightly controlled labor process. In part, the need for control stemmed from the pressure of capital (i.e., the need to complete the project with a minimum of expenditure) and later from the pressures of war. But the control of labor also stemmed from the very vulnerability of the human body amidst a technological landscape. Despite the rhetoric that interwove men and machines, their differences were undeniable. Efforts to assimilate human beings to technology were never fully successful in actuality. Not only were human workers often frustratingly uncontrollable, they were also physically vulnerable, even fragile. Most obviously, men died. And in the attempts of engineers to address issues of worker safety, we can see again the ways in which understandings of the landscape resonated with understandings of the human body in pragmatic, rather than in merely intellectual, contexts.

The dangers of industrialized and mechanized work had been recognized since its introduction in the nineteenth century, but the construction of gigantic concrete dams posed particular and unique dangers to those who built them. As the Bureau itself acknowledged somewhat euphemistically, the work presented "unusual accident prevention problems."<sup>59</sup> The severity of accidents on concrete dams raised the most concern -- that rate was 60% higher than that of any other type of work performed under the Bureau's auspices.<sup>60</sup>

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<sup>59</sup> Memorandum to Chief Engineer, 1 December 1939, p. iv, box 96, file 090.046, Entry 7, WDC, RG 115, NARA, Denver.

<sup>60</sup> *Ibid.*, 40.

As the dangers of the work became more widely and publicly recognized, the Bureau came under pressure to make it safer. For instance, a high school teacher, upon viewing a Bureau promotional film, wrote to the Bureau at the request of his class, asking bluntly how many men had been killed on the project.<sup>61</sup> In fact, when the Bureau first began work on Boulder Dam in 1931, no safety program was in place. Accidents were not even officially recorded until the work had been in progress for four years. Even then, reports and statistics were minimal and were criticized as inadequate by the Department of Labor.<sup>62</sup> In 1936 President Roosevelt announced a new safety initiative within the federal government, which generated an internal examination of safety within the Bureau.<sup>63</sup> In response, the Bureau began to document and classify accidents. In doing so, they drew on the discipline of "safety engineering" which had emerged in the factory setting over the previous two decades.

The emerging concern with safety points to the ambiguous ways in which technology interacts with understandings of the body and more particularly with constructions of gender. While large-scale technology is almost always coded as both white and masculine, it also seemingly requires a very un-masculine submission on the part of those who work with it. In its emphasis on safe work habits and bodily protection, safety engineering ran counter to existing codes of masculinity in which the willingness

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<sup>61</sup> Letter from Paddy Englars, 1 November 1938, box 216, file 090.04, Entry 7, Projects--Colorado River, RG 115, NARA, Denver

<sup>62</sup> Letter to Elwood Mead, 13 April 1935, box 217, file 090.046, Entry 7, Projects--Colorado River, RG 115, NARA, Denver.

<sup>63</sup> Memorandum from John C. Page, 27 July 1937, box 96, file 090.046, Entry 7, WDC, RG 115, NARA, Denver.

to take risks was a critical element. Moreover, part of what made safety work un-masculine was its very focus on the body. Because it dealt with people rather than things, its status as *engineering* had always been open to question. Early safety engineers consistently found themselves defending their profession as "true engineering and "real work for real men" to their skeptical brethren.<sup>64</sup> As the sociologist Sally Hacker has argued, to be involved with the natural, and particularly the social, world has come to be inversely correlated with status within the engineering hierarchy.<sup>65</sup>

What compelled the engineers to attend to safety was the undeniable danger of the work. To read the list of accidents at the major dam sites makes one acutely aware of the fragility of the human body amidst modern, industrial technology: fractured legs, lost fingers, skin burned by cement, death by falling, crushing, drowning.<sup>66</sup> The danger was a product of the heights at which men worked, the machinery with which they engaged, and the harsh environments in which these projects were located. Falls were common. Often the injuries were minor, but many times they were severe and sometimes fatal. Men not only fell but were hurt by falling objects: rocks, booms, cables, sacks of concrete. The safety newsletter put out at Shasta Dam noted that the most serious accidents were often the result of a man throwing material down from a high spot on the

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<sup>64</sup>Mark Aldrich, *Safety First: Technology, Labor, and Business in the Building of American Work Safety, 1870-1939* (Baltimore: Johns Hopkins University Press, 1997), 119.

<sup>65</sup>Sally Hacker, *Pleasure, Power, and Technology: Some Tales of Gender, Engineering, and the Cooperative Workplace* (Boston: Unwin Hyman, 1989), 35.

<sup>66</sup>A partial list of accidents at Reclamation projects is contained in the *Reclamation Safety Record*. These examples are pulled from various issues in the period 1943-44. Prior to 1943, this publication did not catalog all the accidents. See *Reclamation Safety Record*, box 96, file 090.046, Entry 7, WDC, RG 115, NARA, Denver.

dam and unwittingly getting his own clothing caught on the falling object, causing him to be pulled over as well.<sup>67</sup> Accident reports from Grand Coulee Dam in Washington State also indicate the ubiquity of dangerous falls:

Chas. Forsberg #1162, Electrician-Telephone: Fatal, fell from pole while stringing wire.

A.S. Hunter #914, Hunter-Carpenter: Fell against saw, cut wrist.

L.W. Stedding #306, Foreman: Fell from ladder, broken leg.

W. Habeck #1841, rigger: Fell 18 feet when scaffolding broke. Loss tip of finger and bruised.<sup>68</sup>

Succinct, deliberately terse, the accident reports tell a story at odds with that portrayed by New Deal, and even Bureau of Reclamation, iconography. Human beings were not appendages or extensions of machines. To the contrary, they fell; they bled; they bruised. The particular machines and work routines employed at the dam sites each posed a different set of dangers. Each type of tool and task posed its own particular hazards. Men were struck by bulldozers and shovel buckets or cut by saws. Welding torches and flying concrete threatened their eyesight. Among the most prevalent and project-specific

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<sup>67</sup> *The Headtower*, January 1942. This was a mimeographed newsletter put out by the project safety engineer at Shasta Dam. It is available at the Shasta County Historical Society, Redding, CA.

<sup>68</sup> Memo from Construction Engineer (F.A. Banks) to Acting Commissioner, 14 April 1936, box 96, file 090.046, Entry 7, WDC, RG 115, NARA, Denver.

types of injury was the burning of skin by hot concrete. Such burns were often severe as concrete could reach temperatures of 225 degrees on the site.<sup>69</sup>

Concerns over safety and the imposition of safety engineering emerged only slowly on the Bureau's dam projects, and then only in response to public pressure. Bureau engineers, in other words, did not set out to engineer bodies.<sup>70</sup> Despite the initiation of a safety program at Boulder Dam in 1935, when the Bureau began work on Shasta in 1937 no formal safety program was in place. It was not until a well publicized accident, in which a cable broke, killing one worker and seriously injuring five others (including one Bureau employee), that the Bureau designated a safety engineer and instituted a somewhat formalized program. In part, this came as a result of direct pressure from the local Building Trades Council to improve working conditions.<sup>71</sup>

Yet even as the Bureau began to take steps towards improving the safety of its work, evidence suggests that dam workers were themselves resistant to the imposition of safety requirements. In his history of the construction of Hoover Dam, Joseph Stevens mentions the propensity of the workers to take risks. He points specifically to the attraction of men to high scaling, one of the most dangerous (and consequently highest

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<sup>69</sup> "Decade of the Dam Builders," 42.

<sup>70</sup> Over the course of the 1920s and 30s the rise of "safety engineering" had come to emphasize that safety was ultimately a management, rather than workers', responsibility. As historian Mark Aldrich has argued, "by the 1930s...safety was becoming increasingly proactive-- a matter of factory layout, machine design, hazard assessment, and job evaluation, all of which were the duties of engineers and other managers." Aldrich, *Safety First*, 7. Memorandum to Chief Engineer, 1 December 1939, p. 8, RG 115, NARA. Also, Thomas Soule, "What Are Our Accident Statistics for 1938?" in National Safety Council, *Proceedings* 28 (1939), 300-301.

<sup>71</sup> Memorandum from Safety Engineer to Construction Engineer re: "Accident Prevention Program Report," n.d., box 116, file 090.046, Entry 7, Projects--CVP, RG 115, NARA, Denver. Letter from Wallace Shepard to Ralph Lowry, 12 December 1940, *ibid*.

status) jobs on the site. Even amongst themselves, the scalers engaged in competitions to see who could perform the riskiest and most impressive feats.<sup>72</sup> Contemporaries also lauded the high scalers and riggers for their embrace of dangerous work. One article in a popular magazine reprinted several photos of riggers that emphasized and romanticized the risk and daring of their work. Describing one rigger who narrowly avoided death while sustaining an injury and yet returned to work the next day, the writer enthused, "He couldn't resist the lure of the high line."<sup>73</sup>

Such desire for risk and corresponding resistance to safety measures was also evident on the CVP. In May of 1941, the Bureau established a formal safety program at the Shasta damsite. As part of that program, the agency designated a site safety engineer and initiated the publication of a mimeographed safety newsletter, the *Headtower*. Aimed at all (English-speaking) workers, the *Headtower* provided didactic information on safety in the form of accident reports and analyses, cartoons, and discussions of proper and improper practices. Presumably in an effort to solicit workers' attention and interest, the newsletter also incorporated jokes, camp news, and summaries of construction progress.

In its recurring return to certain objectionable and unsafe practices, the newsletter suggests what safety measures the men were not consistently or willingly following. Foremost among these was the wearing of safety goggles. Also mentioned were

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<sup>72</sup> Joseph E. Stevens, *Hoover Dam: An American Adventure* (Norman: University of Oklahoma Press, 1988), 162. Many of the men who worked on Hoover Dam later worked on Shasta, as they followed the head construction engineer, Frank Crowe, from project to project.

<sup>73</sup> Henry F. Unger, "Unsung Heroes Who Build Our Mighty Dams," *Travel*, March 1946, pp. 4-9, 11.

"jumping off transport trucks before they come to a full stop," walking down ladders facing forward, failing to wear hard hats, failing to clean up the worksite and "playing" on the job, which the editor elaborated as "goosing, slapping, sparring, throwing objects..., excessive kidding or talking, wrestling, running after someone."<sup>74</sup>

The newsletter also implies that much of the resistance to safety practices did indeed stem from understandings of masculinity, which denoted safety work as inherently feminizing. Historian Mark Aldrich has noted the challenge safety work faced from male workers who consistently resisted the introduction of safety clothing and devices into factory settings, quoting one company president who recalled that, "the fellow who wasn't willing to risk his safety was looked on ...as a sissy."<sup>75</sup> The *Headtower* responded to this dilemma directly by emphasizing the ways in which *injury* threatened one's manhood -- by reducing or eliminating his breadwinner role and by curbing the potential for sexual gratification. For instance, one cartoon showed three young women finishing sodas in a café, one of whom says to another, "I'm sorry Mable, but you're going to have to pay for mine again. Dad's still on compensation out at the dam."<sup>76</sup> In another issue, a cartoon portrayed a home scene at Christmas, foregrounding a young woman in a sexually suggestive pose, implying that safe work habits would ensure sexual gratification.<sup>77</sup> Yet another tactic was to attempt to redefine masculinity as intelligence

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<sup>74</sup> *Headtower*, September 1941, August 1941, October 1941, November 1941, June 1942, July 1942.

<sup>75</sup> Charles Hook, "Industrial Safety -- Its Relation to the Business of Today," National Safety Council, *Proceedings* 26 (1938), 18-22, quoted in Aldrich, *Safety First*, 136.

<sup>76</sup> *Headtower*, October 1941.

<sup>77</sup> *Headtower*, December 1941.

rather than as a propensity to take physical risks. As a typical slogan appearing in the *Headtower* put it, "The Safe Worker is No Sissy -- He's *Just Plain Smart*."<sup>78</sup>

Yet even as the Bureau undertook a more active safety program, in its analysis of accidents the Bureau consistently minimized the inherent dangers of technology and instead emphasized that problems lay with the workers themselves. Technology, in this view, was not the source of the problem. The fault lay with laboring human beings who were, in a sense, not yet fully adapted to the technology with which they worked. Whatever the injury, Bureau accident reports typically went out of their way to blame workers, rather than the work environment, for accidents. In some cases, however, this proved exceedingly difficult. One accident report noted a severe injury to a Civilian Conservation Corps employee on the project, resulting in the loss of two fingers. The Bureau's accident report (reluctantly?) noted that "the accident may have been more or less unavoidable....At best a ditcher is a very hazardous machine."<sup>79</sup> But in other cases, the Bureau placed the blame directly on the workers' own inexperience and physically unfit bodies:

Large numbers of inexperienced, and in many cases, physically unfit, employees have been brought into heavy construction....It is believed that many hernias, strains, and similar injuries reported during the past year are directly attributable to the poor physical condition of the affected employees prior to their employment....This is particularly true of a

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<sup>78</sup> *Headtower*, August 1942.

<sup>79</sup> "Explanatory Statements -- Lost Time Accidents," June 1937, CCC Division, Bureau of Reclamation, box 96, file 090.046, Entry 7, WDC, RG 115, NARA, Denver.

certain class of Government employees... normally obtained from the relief rolls....<sup>80</sup>

Similarly, with regard to one accident involving a jackhammer, the Bureau's safety analyst wrote, "possibly too heavy for this enrollee...."<sup>81</sup> In fact, one of the changes that the Bureau eventually instituted in response to accident concerns was to require physicals for all prospective employees.

At the same time, safety engineering subjected the workers to a scrutinizing gaze usually reserved for women, non-whites, and the landscape itself. The safety engineers drew maps of the human body -- much as they drew maps of the landscape -- illustrating the parts most prone to accidents under different construction regimes. Eyes and fingers were always the most vulnerable. But relatively speaking, excavation work posed a greater hazard to the head, while concrete placement resulted in proportionately more injuries to the face. This, they argued, helped them to figure out what kinds of additional equipment would be beneficial. Safety goggles for eye injuries, gloves for hand injuries, masks for respiratory problems.<sup>82</sup> As maps of overflow basins and water demands told the engineers where to build their dams, maps of the body told them where to focus their safety engineering. This discourse of safety assumed that workers themselves could be re-engineered through the addition of clothing and other apparatus so that they might become more suited to the technology that they used.

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<sup>80</sup> Memorandum to Chief Engineer, 1 December 1939, p. 9, RG 115, NARA.

<sup>81</sup> "Explanatory Statements -- Lost Time Accidents," June 1937, RG 115, NARA.

Although engineers might well have wanted to avoid such *human* issues, by the late 1930s they realized that continuing technological progress required that they apply their rational powers to improving the men themselves. While modernist designs had striven to adapt the natural landscape to human needs, human beings would, in the end, have to adapt to the new technology. Although they did not set out to do so, engineers eventually accepted the need to engage in "human engineering," however much of an oxymoron that might seem. As a leading engineer wrote in 1937, "The cooperative work of scientists and engineers has made a new material world which calls for *human* readjustments..." for "parallel progress in the adaptation of ourselves."<sup>83</sup> Walker Young, the construction engineer on the Central Valley Project, quoted approvingly the remarks of Stuart Chase, the well-known economist and author, who wrote, "Resource planning is not a matter of engineering alone....The future of the [central] valley depends upon the ability of the people to adjust...their individual wills to the engineering of collective action and responsibility."<sup>84</sup> Here the engineers echoed Mumford, who had argued that machines would require men to improve themselves, that technics enhanced the human personality that submitted to its discipline.<sup>85</sup> Properly outfitted and conditioned, men could adapt to the new technology. Accordingly, in their effort to address the safety problem, the engineers built upon the assumption of their Fordist predecessors that the

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<sup>82</sup> U.S.Bureau of Reclamation, "Accident Prevention Program Report – Summary from September 1938 to January 1942," box 116, file 090.046, Entry 7, Projects–CVP, RG 115, NARA, Denver.

<sup>83</sup> Durand, "Why the Engineer?," 780.

<sup>84</sup> Walker Young, "Address on Central Valley Project before the Tulare Chamber of Commerce," 13 January 1938, p. 19, WRCA, Berkeley, CA.

<sup>85</sup> Mumford, *Technics and Civilization* , 324.

workers themselves were machines, albeit machines that required additional engineering. Technology was, again, the solution. Technology supplemented the natural body as it perfected the natural landscape.

The metaphors here begin to intertwine: machines were like bodies but bodies, at least workers' bodies, were like the natural landscape: inefficient, sometimes dangerous, and in need of rational transformation. In other words, bodies as well as nature required finishing. But the body that had been "safety engineered" was inevitably a normalized rather than an individual body. It was also an abstract body that could be discussed objectively and dispassionately. The value of body parts could be fixed in monetary terms: \$1000 for an eye, \$2500 for an arm or leg.<sup>86</sup> Such a body could hardly make a serious bid for masculinity. If not feminized, it was at least neutered. This was something that the workers understood implicitly when they jumped off the high blocks, left their safety goggles and hardhats at home, and engaged in dangerous pranks on the job.

The modernist reshaping of nature in the Central Valley was thus caught up in a reshaping of human bodies, as machines, technology, and engineering took on an ever-larger role in American material and cultural life. Such technology not only enabled the ever-more-radical transformation of nature and space, it also, in the end, required adaptations on the part of human beings. The discourse of safety engineering was one

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<sup>86</sup> Letter from E.P. Herges to Geo. G. Sanford, 18 February 1938, box 96, file 090.046 (1938-39), Entry 7, General Administration, WDC, RG 115, NARA, Denver.

way in which engineers imposed their vision on men as well as nature. Modernist thinking, in other words, created a world of organic machines and cyborgs, artificial rivers and engineered men.

Many of the engineers and technical planners who carried out these projects saw themselves as the agents of an American future that was technologically sophisticated, and, at the same time, humanistic. Technological modernists set out to change the relationship between human beings and nature, to realize and make visible the order that was implicit in nature. Both nature and bodies might be properly finished and more harmoniously integrated with one another through the careful application of technology. If their plans ultimately resulted in a more thorough rationalization of both nature and human beings, that should not necessarily be read back into their intentions, or into the technology itself. But by blurring the boundaries between technology, human beings, and nature in new ways, they helped to pave the way -- literally and figuratively -- for an even more radical reworking of the landscape.

## *Chapter Five*

### **Freeways**

It is hard to get a handle on the Central Valley in the post World War II era. For environmentally inclined historians, the period is one long denouement -- the consolidation of corporate agriculture, the further extension of the massive water projects set in motion in the 1930s, and the abandonment of any mainstream political concern for equity, democratic agrarianism, or natural limits. Yet the postwar period deserves further scrutiny on the part of environmental historians because it is only in tracing the implementation and consummation of the technological landscape that some of the reasons for its triumph can be understood.

One of the most significant alterations to the valley in this regard was the construction of modern freeway systems. Like large dams and concrete rivers, freeways represent an enormous reworking of the landscape, a realization of "third nature," which can never be mistaken for original "first nature." Their scope requires the marshalling of technology, labor, and political and economic power on a grand scale. Freeways are markers of the power of the modern state, the capacity of modern technology, and the success of modern engineering. Highway engineers of the postwar period saw

themselves, quite self-consciously, as the counterparts of dam and water-resource engineers. Particularly in the Western U.S., these two arenas constituted the major public works projects of an unprecedented era of affluence that lasted from roughly 1945 to 1970.<sup>1</sup> By the early seventies, economic recession and the corresponding decline in state revenues, coupled with popular opposition from affected communities and environmentalists, resulted in a dramatic curtailment of both freeway construction and large water projects. Looking back, engineers recalled the postwar decades as a kind of golden age.<sup>2</sup>

Relationships to the landscape in this period were more forthrightly mediated by technology and engineering than in previous decades, and highway engineers, like their counterparts in other fields, saw technology rather than nature as central to the project of American identity. "Civilization" in the valley as elsewhere was now marked by technological rather than agricultural projects. The culture of technological modernism

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<sup>1</sup> The nucleus of California's freeway system was conceived during World War Two. Although the State's first "freeway" legislation was passed in 1939, before the war only eight miles of freeway existed in the state. It was not until 1947 that the State legislature provided significant funding for the construction of freeways. In that year, the legislature passed Senate Bill 5, the "Collier Bill," which adopted a ten-year plan to build a state-of-the-art freeway and expressway system. See David W. Jones, Jr., *California's Freeway Era in Historical Perspective* (Berkeley: Institute for Transportation Studies, 1989).

<sup>2</sup> William R. Green, "Transportation Memories," oral history transcript, June 1989, Highway Recollections Series, California Department of Transportation (Sacramento, 1989), 20, 30; Bruce Seely, Mark Rose, David Jones, John T. Greenwood, Jonathon L. Gifford, and Howard Rosen, *Interstate Highway Research Project – Analysis*, Final Report, Part I (Washington, D.C.: American Association of State Highway Officials, 1990), 181-84. For a similar expression on the part of Bureau of Reclamation engineers, see Wendy Nelson Espeland, *The Struggle for Water: Politics, Rationality, and Identity in the American Southwest* (Chicago: University of Chicago Press, 1998), 134. For a discussion of reasons for the decline of freeway construction in California that emphasizes fiscal constraints, see Brian D. Taylor, "Public Perceptions, Fiscal Realities, and Freeway Planning: The California Case," *Journal of the American Planning Association* 61 (Winter 1995), 43-56.

as embodied by engineers reshaped both the environment and the human-nature relationship. This required a re-envisioning not only of the landscape but also of the human body.

At the same time, the investigation of freeway projects also returns to issues of travel, demonstrating again how the perception and understanding of any environment are determined in part by the way in which we move through it. In the nineteenth century, nature seemed to proscribe and limit movement in all kinds of ways, just as nature had also limited agriculture. So while the reworking of the rivers and streams of the valley was an effort to mold the region into a place more suitable for agriculture and white agrarianism, the building of freeways was an attempt to finally eliminate the problems of travel and to allow for the uninterrupted and ever-greater movement of people and goods. In the process, the relationship between human beings and the landscape they moved through was radically altered. Freeways made it possible to experience the valley as merely one more abstract space of modernity.

For residents and travelers alike, the freeways that traverse the valley now comprise one of its principal geographic features. Highway 99 travels along the eastern edge of the San Joaquin Valley through the region's principal towns -- Bakersfield, Fresno, Modesto, Sacramento, Chico, Red Bluff. It was laid out in 1912, roughly along the route of the Southern Pacific Railroad, although initially two rail routes ran through the Sacramento Valley, one on each side of the Sacramento River. Ninety-nine was a highway that developed along pre-existing travel routes: Indian trails, wagon roads, and

stagecoach routes, and eventually the railroad.<sup>3</sup> Emphasizing the vital role the road plays in the region, one San Joaquin Valley newspaper referred to Highway 99 "our Mississippi River."<sup>4</sup> Interstate-5, in contrast, developed an entirely new route of travel along the San Joaquin Valley's sparsely populated western side, and then followed the route, more or less, of 99-West through the Sacramento Valley. A product of the federal Interstate Highway Act, the southern portion of I-5 was constructed in the 1960s and was never intended to serve the valley; instead it was planned as a high-speed thoroughfare that would reduce travel time between northern and southern California. Its relationship to the historical valley has always been tenuous. Whereas Highway 99 continued to serve large numbers of intra-valley travelers in the postwar decades, I-5 has been almost exclusively a route through, but not of, the southern half of the valley. Nonetheless, as one local writer asserts, "The cleavage of Highway 99 and I-5 between Wheeler Ridge and Stockton define [the San Joaquin Valley] more closely than any common watershed or jurisdiction."<sup>5</sup>

To compare the geography of freeways to that of a watershed or river is a common but noteworthy conceit. It suggests the ways in which technological features have replaced, or at least overwritten, natural features, both on the ground and in our own

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<sup>3</sup> James Maurice Jensen, "The Development of the Central Valley Transportation Route in California to 1920 (Ph.D. diss., University of Southern California, 1965), 162-76.

<sup>4</sup> *Fresno Bee*, 4 May 1977.

<sup>5</sup> Nick Zachreson and Richard Hammond, *The San Joaquin Valley: A Portrait* (Visalia: Visalia-Corralitos, 1979).

minds, and the extent to which engineering has become part of the valley's "environmental" history. In her novel of 1960s LA, Joan Didion self-consciously assimilates the freeway to a river, writing of her heroine:

She drove [the freeway] as a riverman runs a river, every day more attuned to its currents, its deceptions, and just as a riverman feels the pull of the rapids in the lull between sleeping and waking, so Maria lay at night in the still of Beverly Hills and saw the great signs soar overhead at seventy miles an hour, *Normandie*  $\frac{1}{4}$  *Vermont*  $\frac{3}{4}$  *Harbor Fwy* 1.<sup>6</sup>

In Didion's novel, the freeway forms the landscape for her story and in that sense it replaces the Sacramento River, which dominated her first book, *Run River*.<sup>7</sup>

As Didion and others recognized, freeways radically changed the human experience of any landscape and thus had potentially enormous cultural implications. Technologies always imply and condition the human beings who engage them. As a hammer both implies a handed-human being and also encourages the development of the skill of hammering, so freeways imply modern drivers and also condition human beings to the experience of driving. For Didion, the freeway both represents and perpetuates the sense of urban anomie. Similarly, in a work published in 1974, the philosopher Henri Lefebvre invoked the common experience of highway driving to illustrate his larger

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<sup>6</sup> Joan Didion, *Play It As It Lays* (New York: Farrar, Straus & Giroux, 1970), 16.

<sup>7</sup> Joan Didion, *Run River* (New York: I. Obolensky, 1963).

contention concerning the violence done to both history and nature through the simplification and administration of space:

The driver is concerned only with steering himself to his destination, and in looking about sees only what he needs to see for that purpose; he thus perceives only his route, which has been materialized, mechanized and thus technicized, and he sees it from one angle only -- that of its functionality: speed, reliability, facility. Someone who knows only how to see ends up, moreover, seeing badly....Space is defined in this context in terms of the perception of an *abstract subject*, such as the driver of a motor vehicle, equipped with a collective common sense, namely the capacity to read the symbols of the highway code, and with a sole organ -- the eye -- placed in the service of his movement within the visual field. Thus space appears solely in its reduced forms.<sup>8</sup>

For Lefebvre, the automobile driver is the paradigmatic "abstract subject" of modernity, a creation of the late capitalist state, who operates in a reduced and "sliced up" space, relying only upon a single sense -- vision -- to orient herself in the world. Lefebvre's account uses the freeway to emphasize the ways in which the sensual human body has been anaesthetized and human experience cruelly circumscribed. Whereas in the early twentieth century, automobiles had been hailed as offering a new and exciting form of

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<sup>8</sup> Henri Lefebvre, *The Production of Space*, trans. Donald Nicholson-Smith (Oxford: Blackwell, 1991), 313. For a more recent analysis of the effect of the modern automobile on postwar French culture, see Kristin Ross, *Fast Cars, Clean Bodies: Decolonization and the Reordering of French Culture* (Cambridge, MA: MIT Press, 1995), 15-70.

experience, by 1970 they were widely condemned for narrowing experience, homogenizing space, annihilating community. For Lefebvre the experience of driving was the *sine qua non* of sensory deprivation and spatial homogenization.

It is instructive to compare these assessments from the sixties and early seventies with the drawings and photographs produced by planners and engineers just two or three decades earlier. Such a comparison illustrates the ways that the perception of the freeway and the modernist landscape more generally had changed. For instance, the 1946 report on highways prepared by the California Legislature's Committee on Highways, Streets, and Bridges offers renderings of idealized highways in rural and urban environments.<sup>9</sup> In this report, intended as the basis for California's first comprehensive highway legislation and widely endorsed both politically and popularly, sinuous highways curve through neat fields, and attractive bridges grace river crossings in rural areas. There is never more than a handful of cars in view. It is an appealing blend of the old and the new, yet another "middle landscape." Renderings of the urban environment are somewhat more dynamic in their composition, yet still harmonious. Curving ribbons of highway pass immediately next to multi-story buildings that take improbable forms allowing them to mesh seamlessly with the freeway. The roadways meet and separate at many different grades, always with graceful curves. The few cars present are rendered with some

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<sup>9</sup> California Legislature, Joint Fact-Finding Committee on Highways, Streets, and Bridges, *Engineering Facts and a Future Plan*, 1946. This report was written in part by G. Donald Kennedy, one of the leading highway engineers of his generation, formerly chief highway engineer for the State of Michigan, and subsequently vice president of the Automotive Safety Foundation. With the passage of the Collier Bill in 1947, the legislature adopted this report as state highway policy.

blurring, suggestive of mobility and speed. Overall the drawings convey harmony, controlled complexity, and a sense of exciting newness.

Such idealizations of the modern highway landscape came not only from highway engineers and politicians, however. Intellectuals had been advocating well planned highways as a solution to chaotic urban landscapes since the 1920s; and, in fact, the cities of New York and Detroit established the first automotive parkways in that decade. Their conceptualization can be traced back even further, however, to the carriage routes and pleasure drives of Frederick Law Olmsted in the late nineteenth century. As historian Mark Foster has pointed out, the "superhighway" concept arose from the desire to correct the real and perceived deficiencies of the nineteenth-century city, which were rooted in overcrowding. By opening up additional areas for housing, highways -- like their predecessors, the nineteenth-century street railways -- offered the potential for urban workers to escape slums, pollution, and disease.<sup>10</sup>

It was in the early thirties that the modernist vision of highways was widely publicized and endorsed. For instance, in 1931 Benton MacKaye and Lewis Mumford published an article entitled "Townless Highways" in *Harper's Monthly* in which they lamented the national failure to design the landscape to accommodate the automobile. They specifically attacked "the scorching ugliness of badly planned and laid out concrete roads peppered with impudent billboards" and the "vast, spreading metropolitan slum of

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<sup>10</sup> Mark Foster, *From Streetcar to Superhighway: American City Planners and Urban Transportation, 1900-1940* (Philadelphia: Temple University Press, 1981).

multiple gas stations and hot-dog stands." MacKaye and Mumford were reiterating common criticisms of billboards, traffic, and ugly roadside development. In response they advocated a modernization of the environment itself through comprehensive planning. With specific reforms such as limited-access roads and large, protected rights-of-way, they felt that the automobile could become "an honor to our mechanical civilization." What distinguished the modernist landscape they endorsed were efficiency, smooth lines, rational plans, and the absence of unplanned and disorderly development. They argued that the technology of the automobile offered vast social possibilities if only people would make the effort to integrate it into a larger organic system. As they put it, "The October revolution of the automobile" would "transform the physical means of life and make possible a higher type of civilization..."<sup>11</sup>

Norman Bel Geddes popularized similar views of modern highways in his *Futurama* exhibit constructed on behalf of General Motors at the 1939 World's Fair in New York. Not only was this exhibit the most popular at the fair, drawing five million visitors, it was widely publicized in popular magazines, daily newspapers, and newsreels. Bel Geddes himself published a book elaborating on the exhibit in the following year which reprinted several photographs of his scale models. Like the contemporaneous reports of highway designers, Bel Geddes's "Magic Motorways" emphasized the speed and convenience that new highways would bring to the motorist. His models offered a

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<sup>11</sup> Benton MacKaye and Lewis Mumford, "Townless Highways for the Motorist: A Proposal for the Automobile Age," *Harper's Monthly* 163 (August 1931), 347-56; quotations from 347, 356.

vision of highways twenty years in the future -- in 1960 -- in which electronically guided cars traveled along controlled access highways at speeds of up to 100 miles per hour. Major highways offered 14 lanes: four 50-mph lanes, two 75-mph lanes and one 100-mph lane in each direction, with traffic controllers situated along the route to radio directions to motorists. Where the terrain permitted, several miles of land separated the two halves of the highway, providing a parkway-like landscape. Bel Geddes clearly borrowed the ideas of famed modernist architect Le Corbusier, and in fact, collaborated with another respected modernist architect, Eero Saarinen, on the exhibit. But Bel Geddes's ideas were not merely those of a designer unconcerned with the practicalities of engineering; he had actually developed many of his own ideas during past collaborations with a highly respected traffic engineer, Miller McClintock of Harvard University.<sup>12</sup> Equally suggestive of the ways in which ideas of modern planning circulated among engineers, planners, and lay people was the comment of highway engineer Frank Sheets, who after viewing the exhibit, wrote a positive commentary on it. As Sheets expressed his reaction, "There may arise certain practical questions when this exhibit is viewed. But I venture this opinion, that of every 100 people who are fed through the ramps into that awesome chamber of highway prophecy, 100 emerge from the exit with a very positive conviction

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<sup>12</sup> Norman Bel Geddes, *Magic Motorways* (New York: Random House, 1940); Jeffrey L. Meikle, *Twentieth-Century Limited: Design in America, 1925-1939* (Philadelphia: Temple University Press, 1979), 201-206.

that some heroic measures are needed, both in engineering, planning, and financing, if tomorrow's needs are to be met."<sup>13</sup>

The California Division of Highways developed a similar although considerably more prosaic exhibit at precisely the same moment for the Golden Gate International Exhibition on San Francisco's Treasure Island. Entitled "A Quarter Century of Highway Progress," the exhibit contrasted the road systems of 1912 ("Yesterday"), 1939 ("Today"), and an indeterminate "Tomorrow." "Yesterday" showed eroded hillsides, rutted dirt roads, and unsafe crossings. The "Today" exhibit contained erosion problems and a single remaining dirt road, but the more problematic aspects were billboards and disorganized traffic. These problems have been predictably eliminated in the "Tomorrow" section. But most interesting here is the much larger expanse of landscape that is visible. Tomorrow's highways seem to sit easily in an orderly and vast natural landscape.<sup>14</sup> While not nearly as far-reaching as Bel Geddes's proposals, the California exhibit nonetheless shared certain aspirations with its more famous counterpart: a landscape ordered by technology and a narrative of cultural progress that was legible on the land.

In one sense, the construction of modern highways was merely one more step in the capitalist reorganization of space -- an attempt to facilitate commodity flows from

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<sup>13</sup> Frank T. Sheets, "The Development of Primary Roads During the Next Quarter Century," *American Highways* 18 (October 1939), 34; cited in Bruce E. Seely, *Building the American Highway System: Engineers as Policy Makers* (Philadelphia: Temple University Press, 1987), 175.

<sup>14</sup> *California Highways and Public Works* 17 (April 1939), 10-11.

their region of origin to regional, national, and international markets; certainly the imperatives of an increasingly global capitalism were essential to their construction.<sup>15</sup>

But in the minds of the engineers who constructed this system, economic efficiency was an over-riding rationale but only a partial goal. In their minds, engineering projects served cultural as well as economic desires.

Much of what was attractive about such imaginings of future highways systems was their very newness.<sup>16</sup> They embodied, and Americans responded to, the ideas of modernity that they conveyed. Underlying the multitude of proposed highway projects in the 1930s and 40s was the widely shared sense that the landscape itself needed to be reworked, "remade," in order to facilitate the realization of a truly modern (American) civilization. Highway engineers, as well as Mumford, Bel Geddes and other apostles of the modern landscape, reiterated again and again the connection between modern highways and "civilization." On the one hand, the engineers pointed pragmatically to the economic benefits of highways and the need to move goods in order to facilitate profits and economic growth. But the correlation they drew between highways and civilization ran much deeper than such instrumentalist arguments. Building upon the technological modernism embraced by dam builders in the 1930s, highways engineers argued that highways embodied and made possible certain modern qualities of life: freedom,

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<sup>15</sup> William Cronon, *Nature's Metropolis: Chicago and the Opening of the Great West* (New York: Norton, 1991); David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Cambridge, MA: Blackwell, 1989).

mobility, efficiency, speed, and cultural and economic integration. This was made explicit in Bel Geddes's *Futurama*, which press releases touted as "a dramatic visual demonstration of how progress in transportation is related inseparably to progress in civilization."<sup>17</sup> Similarly, a Harvard sociologist wrote in 1950 that "[different] types of highway systems are inevitably correlated with different types of culture," and that the most developed societies were, of course, those with unified, modern freeway systems.<sup>18</sup> But such statements were equally likely to come from the mouths of practicing highway engineers. As a committee of the National Highway Research Board asserted, "Progress toward civilized society and government unfolded in relation to the means available for communication and transportation."<sup>19</sup>

Mid-century engineers, like their counterparts in the 1930s, correlated large projects of civil engineering with civilization. Placing their own projects in the context of a long history, they referred to the builders of ancient monuments as "engineers," implicitly and sometimes explicitly arguing that engineering was what made "progress" possible in all times and places. That engineers were imbued with this notion of the world-historical significance of their profession is evident not only in their references to

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<sup>16</sup> Beatriz Jaguaribe, "Modernist Ruins: National Narratives and Architectural Forms," *Public Culture* 11 (27/1999), 294-312.

<sup>17</sup> Cited in Christina Cogdell, "The Futurama Recontextualized: Norman Bel Geddes's Eugenic 'World of Tomorrow,'" *American Quarterly* 52 (June 2000), 230.

<sup>18</sup> Carle C. Zimmerman, "The Highway from the Point of View of the Sociologist," in *Highways in Our National Life: A Symposium* ed. Jean Labatut and Wheaton J. Lane (Princeton: Princeton University Press, 1950), 123.

ancient Egyptians and Mesopotamians as engineers, but in remarks such as that by a California engineer that contemporary highway engineers were "faced with the problem of planning and constructing the largest public works program in the history of the world."<sup>20</sup> At the same time, engineers in postwar America enthusiastically endorsed the need to advance their profession in developing countries, for they believed that engineering offered the key to developing civilization across the entire globe. Exemplary of this belief was the effort on the part of European and American engineers in the mid-1960s to establish an international association of engineers to facilitate global cooperation, one of many such ventures in the period. As they put it, "A strong and dynamic engineering profession is essential to the successful development of any nation. Engineering harnesses the manpower and natural resources of region to bring about progressive advance of its agriculture, industry, commerce, culture and general standard of living."<sup>21</sup>

Planners and designers had voiced the idea that the landscape required radical remodeling since the 1920s, but such assertions became more popular and widespread in

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<sup>19</sup> "Controlled Access Expressways in Urban Areas: A Symposium," *Highway Research Bulletin* 25 (1950), 1.

<sup>20</sup> L.L. Funk, "Modern Tools for the Highway Engineer," *Ninth Annual California Street and Highway Conference* (1957), 26. Also, H.A. Flanakin, "Highway Development," *Traffic Quarterly* 11 (January 1957), 126-37. Thomas MacDonald, head of the BPR wrote that "the principles of highway administration and engineering which have matured in our country...have non-controversial and constructive values if held out to under-developed countries as a major element of the foreign technical assistance program." Thomas H. MacDonald, "The Engineer's Relationship to Highway Transportation," *Traffic Engineering* 24 (July 1954), 369.

<sup>21</sup> "A World Organization of Engineers," *Civil Engineering* 36 (June 1966), 38.

the immediate postwar years. The landscape itself needed to reflect America's entrance into a true modernity following World War II. But much of the attraction of the superhighway concept lay in the fact that it also addressed the cultural deficiency of the nineteenth-century city – its inability to stand as a representative of postwar American culture. As the urban designers Christopher Tunnard and Boris Pushkarev wrote in the introduction to their seminal book on highway design published in 1963, "If we are to justify American civilization before our own population and in the eyes of the world, the creation of a more appropriate physical shape for the society is one of the most urgent tasks ahead."<sup>22</sup> Moreover, the rutted, dirt roads and chaotic, accident-prone highways still in evidence in most rural American communities were a clear symbol of backwardness, associated with the "developing" countries and non-white populations, and something to be quickly erased from the American landscape. For engineers, freeways represented their attempt to mold California and the United States, and eventually the world, into a modern, efficient form that would allow the smooth movement of people and goods.

There are linkages here with the agrarian discourse of a century before. Like nineteenth-century agrarians, mid-twentieth-century Americans, and especially engineers, looked to the landscape to authorize their larger cultural projects. If the nineteenth-century project had been the white occupation of the western half of the continent, the

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<sup>22</sup> Christopher Tunnard and Boris Pushkarev, *Man-Made America: Chaos or Control?* (New Haven: Yale University Press, 1963), ix.

mid-twentieth century project was America's dominance in the postwar world. No longer able or willing to express such an aspiration in explicitly racial terms, engineers and others cast it in increasingly technological terms –the global project of "development" and "modernization," which would be led by those with superior technology. That race and technology were correlated was a fortuitous accident in their eyes rather than biologically predetermined.<sup>23</sup> Whereas agrarians had argued for the superiority of white agriculture, particularly horticulture, mid-twentieth century engineers, and Americans more generally, looked to their technological achievements. And as they embarked upon the international work of modernization, it became critical that that same project be fully realized at home. Highway modernization was an essential component of that larger effort. Moreover, the postwar embrace of technology marked the culmination of a cultural shift that had begun in the 1920s and 30s. American identity was now tied primarily to technology rather than to nature. What America and American engineers in particular offered the world was a rich "technological heritage."<sup>24</sup>

Yet engineers did not typically posit nature and technology as opposites. They rarely construed their own efforts as examples of conquest. Instead, they saw them as

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<sup>23</sup> Recently a few scholars have suggested that racial anxieties underpinned modernist planning. See, for instance, Cogdell, *The Futurama Recontextualized*, and Mabel O. Wilson, "Dancing in the Dark: The Inscription of Blackness in Le Corbusier's Radiant City," in *Places Through the Body*, ed. Heidi J. Nast and Steve Pile (New York: Routledge, 1998), 133-52. Engineers in this period were likely to see themselves as explicitly anti-racist, and technology as a racially neutral, and even a racially unifying, enterprise. For an example of this attitude among highway engineers, see M. Earl Campbell, "Nigeria: A New Beat," *Traffic Quarterly* 19 (January 1965), 17-27.

<sup>24</sup> Campbell, "Nigeria," 26.

either a rectification of past mistakes or as part of a longer tradition of landscape evolution and finishing. Even as technology replaced nature as the focal point for American identity, it remained critical that technology harmonize with and complement the natural landscape. Engineers did not view their projects as an overcoming so much as a reshaping of the environment, an intelligent response to the difficulties and inadequacies of nature in its raw forms.

From the 1930s forward, and occasionally even earlier, discussions of highway design emphasized that good technology still emerged from and complemented nature. In their writings, engineers consistently returned to the need to blend highways with the landscape. The idealized drawings of expressways in rural areas, for instance, suggest that the concept of the "middle landscape," however modified, still operated in postwar American culture. Suburbs, of course, offered the clearest expression of the desire for the middle landscape in this period, but well-designed and carefully landscaped highways shared in that same aesthetic. In these highway renderings, careful engineering orders the environment and contributes to human safety without disrupting or degrading nature. The sinuous cloverleaf interchange echoes the rolling terrain, while straight sections of highway merely complement the grid pattern of agricultural fields. In this thinking, highways and other large engineering undertakings did not constitute an intrusion upon otherwise "natural" landscape, but quite the opposite. Architecture critic Reyner Banham

understood this well when he asserted that the Los Angeles freeway system constituted a "fourth ecology," the equivalent of the foothills, the plains, and the coast.<sup>25</sup>

The most obvious example of this belief lay in the concept of the "complete highway," which was codified and adopted in 1943 by the federal Highway Research Board (HRB) and American Association of State Highway Officials -- the two principal institutional sites for American highway standards and design. Promulgating minimum uniform standards for American highways in anticipation of the forthcoming interstate highway legislation, these organizations announced that the complete highway incorporated four essential qualities: utility, safety, beauty, and economy. They further defined "beauty" as "the harmonious integration of engineering, architectural, and landscape techniques." Moreover, they argued that "conservation of stream banks, fine trees, weathered rock ledges, and similar natural features" was essential to the "attainment of beauty in a finished highway."<sup>26</sup> For instance, the federal report on express highways published in 1944, *Interregional Highways*, described the need for attention to the landscape on rural highways:

The object should be the preservation or where necessary, the recreation of a natural foreground environment in harmony with the distant view. To

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<sup>25</sup> Reyner Banham, *Los Angeles: The Architecture of Four Ecologies* (New York: Harper and Row, 1971).

<sup>26</sup> Quoted in W.A. Bugge and W. Brewster Snow, "The Complete Highway," in *The Highway and the Landscape*, ed. W. Brewster Snow (New Brunswick, NJ: Rutgers University Press, 1959), 27. See also, H.J. Neale, "Report of Committee on Roadside Development," Highway Research Board, *Proceedings* 24 (1944), 157-63.

that end existing well-placed and beautiful trees should be preserved wherever possible; unpleasing and view-obstructing growth should be removed; and only where the irregular introduction of trees and other growth will serve to highlight the natural beauty of the roadside view or where it is especially desirable to screen unsightly or distracting objects or activity should the replanting of trees receive consideration. Trees replanted for such reasons should invariably be native to the environment.<sup>27</sup>

The concept of the complete highway was influenced by the work of Jac Gubbels, a landscape architect from Holland who joined the Texas Highway Department in the early 1930s. Gubbels developed an influential aesthetic for Texas highways that received recognition from the Bureau of Public Roads and which he explicated in a book entitled *American Highways and Roadsides*, published in 1938. What is particularly interesting about Gubbels's book, however, is his invocation of the mimetic ideal. He consistently relates engineering to nature. As Gubbels instructed his colleagues in language reminiscent of nineteenth-century irrigation engineers, "The road should be built with a careful regard for the dictates of nature." Moreover, he attacked those highways that

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<sup>27</sup> Congress, House, *Report of the National Interregional Highway Committee*, 78<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1944, H.Doc. No. 379, p. 91. This report was authored by an executive committee appointed by Franklin Roosevelt to develop a postwar highway policy. The committee consisted of several nationally prominent highway engineers -- Thomas MacDonald (head of the BPR), G. Donald Kennedy, and C.H. Purcell (of the California Division of Highways) -- as well the former governor of Alabama, Bibb Graves, and several prominent planners -- Frederic A. Delano, Harland Bartholomew, and Rexford Tugwell. The report recommended an interregional system of restricted access roads with uniform design standards....For a discussion of the committee work and the report, see Seely, *Building the American Highway System*, 179-82.

ignored the natural topography and drainage not merely as ineffectual and inefficient, but as a betrayal of true engineering.<sup>28</sup>

Highway engineer F.W. Cron offered a detailed explication of the complete highway in a widely read article published in 1950. Cron advocated not only the preservation of natural features but also careful attention to alignments and grading. Arguing that the tools of modern engineering allowed the designer "to fit the highway more closely to the natural contours of the land...", Cron asserted that it was the task of blending the road with nature that made highway engineering necessary.<sup>29</sup> Like Gubbels, he told his readers that poorly laid out roads were evidence of the absence of engineering. Cron particularly lamented the influence of "railroad thinking" on highway planning, which had reduced the landscape to a concern with grade and distance. When translated to highways, such thinking resulted in a predilection for the "long tangent" or straightaway, which, in Cron's words, represented a "certain defiance of natural obstacles."<sup>30</sup> Cron saw highway engineering as an opportunity to rectify the deficiencies of this earlier transportation system.

While engineers such as Cron focused on the pragmatics of harmonizing technology with nature, many mid-century critics and artists were apt to fuse them

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<sup>28</sup> Jac L. Gubbels, *American Highways and Roadsides* (Boston: Houghton Mifflin, 1938), quote from p. 9. For an analysis of the integration of roads and nature in the context of American national parks, see David B. Louter, "Windshield Wilderness: The Automobile and the Meaning of National Parks in Washington State (Ph.D. diss., University of Washington, 2000).

<sup>29</sup> F.W. Cron, "The Art of Fitting the Highway to the Landscape," in *The Highway and the Landscape* ed. W. Brewster Snow (New Brunswick, NJ: Rutgers University Press, 1959), 91.

intellectually. The visual artist Gyorgy Kepes, who took a particular interest in issues of highway design and the industrial landscape, argued that modernist architects and designers "restored" the landscape to nature through their emphasis on natural "rationality":

Abandoning nature in its subject matter, their art became nature again by its organic quality. Artists use this integrated vision to re-enter their environment, in order to reshape our surroundings and restore them to nature -- a higher nature informed by human understanding.<sup>31</sup>

In his influential book on modern art and landscape published in 1956, Kepes juxtaposed aerial photographs of the landscape, photographs taken with a microscope, and photographs of modern artworks. Several of the landscape photographs depicted freeways -- both single roads curving through rural land and complex urban interchanges. Moreover, he explicitly appropriated Ralph Waldo Emerson, whose transcendentalist philosophy responded directly to the American industrial revolution of the nineteenth century. In a characteristic passage quoted by Kepes, Emerson wrote:

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<sup>30</sup> Cron, "The Art of Fitting the Highway," 89.

<sup>31</sup> Gyorgy Kepes, *The New Landscape in Art and Science* (Chicago: Paul Theobald and Co., 1956), 70. Kepes was a professor visual arts at MIT, where he collaborated with urban planners Kevin Lynch, David Appleyard, and others on studying the aesthetics of modern freeways. See Louis Ward Kemp, "Aesthetes and Engineers: The Occupational Ideology of Highway Design," *Technology and Culture* 27 (1986), 787-88.

When its errands are noble and adequate, a steamboat bridging the Atlantic between Old and new England and arriving at its ports with the punctuality of a planet, is a step of man into harmony with nature. The boat at St. Petersburg, which plies along the Lena by magnetism, needs little to make it sublime. When science is learned in love, and its powers are wielded by love, they will appear the supplements and continuations of the material creation.<sup>32</sup>

While revering nature as a source of truth and spiritual awakening, Emerson had also naturalized technology, arguing that nature and technology stemmed from the same ultimate source. By quoting Emerson, Kepes implied that the mid-twentieth century landscape might also be sublime. In Emerson's thinking, as in Kepes's, to perceive technology as "unnatural" was symptom of intellectual shortcoming.

While a full century separated the architects of the freeway system from Emerson, their approach to the landscape might well be described as Emersonian.<sup>33</sup> Highways were not in themselves unnatural intrusions on the landscape, but, when properly constructed, they offered a new means of appreciating nature, much as the railroad had provided for Emerson. In the mid-1950s, popular endorsements of the proposed Interstate Highway System emphasized the fact that these roads would provide

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<sup>32</sup> Ralph Waldo Emerson, *Essays* (Boston: Houghton Mifflin, 1865), cited in Kepes, *The New Landscape*, 75.

<sup>33</sup> I am indebted here to a similar observation by Richard White made in connection with those who advocated hydroelectric dams in the 1930s. See White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill and Wang, 1995), 48.

Americans better access to sites of scenic nature.<sup>34</sup> Technology offered the potential of reconnecting human beings with their environment, a "step of man into harmony with nature."

By the early 1960s, articles in highway and engineering journals on good highway design were numerous, and they consistently pointed to the need to consider the highways' relationship to nature.<sup>35</sup> Engineers wrote repeatedly of the need to mold roadside slopes into the existing terrain and to consider conservation in laying out routes. One state highway official commended a particular highway by noting that it was "architected to nature," with an alignment such that it "flowed" through the landscape.<sup>36</sup> The assimilation of highways to natural rivers was a commonplace among engineers as well as writers, suggesting again the ways in which the technological both mimicked and displaced the landscape's natural features.

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<sup>34</sup> "New Vistas of the Road," *Life*, 19 November 1956, pp. 73-76.

<sup>35</sup> Louis B. Wetmore, "Visual Approach to Highway Planning and Design," Highway Research Board, *Bulletin* 190 (1958), 29-40; Lynn M.F. Harriss, "The Landscape Architect in Highway Transportation Planning," *Traffic Quarterly* 19 (January 1965), 43-58; "Beautifying California," *California Highways and Public Works* 45 (Jan. - Feb. 1966), 42-44; "Scenic Routes," *California Highways and Public Works* 41 (Mar. - Apr. 1963), 2-3; "California Roadsides," *California Highways and Public Works* 40 (Jul. -Aug. 1961), 34-41.

<sup>36</sup> Howard S. Ives, "Roadside Development Safety Features in Highway Design Standards," Highway Research Board, *Proceedings* 41 (1962), 83. Several scholars have attributed in post-1960 engineering interest in highway aesthetics to the popular opposition to freeway construction that first emerged in the late 1950s and to the increased involvement of planners and architects in freeway design. While certainly these developments increased, or at least renewed, interest in aesthetic design, I have tried to suggest here that engineering concern with these issues precedes the freeway revolt by at least two decades. See Kemp, "Aesthetes and Engineers"; Clifford Donald Ellis, "Visions of Urban Freeways, 1930-1970" (Ph.D. diss., University of California at Berkeley, 1990). On the freeway revolts, see Albert B. Kelly, *The Pavers and the Paved* (New York: D.W. Brown, 1971).

One of the principal tools which allowed this nature-conscious design to occur, according to Cron and others, was the rise of aerial photography and photogrammetry, which were still relatively new and unfamiliar techniques to highway engineers in the 1940s. Like the dam-builders of the previous decade, highway engineers of the postwar era were coming to rely increasingly on the aerial view. Such a view, unlike that at ground level, offered unobstructed vistas, and also removed potentially distracting sensory experiences such as insects and bad weather, "enabling the engineer to see possibilities which otherwise might be overlooked."<sup>37</sup> As Cron maintained,

In the early days the [highway] locator relied entirely upon ground observation, first- or second- hand, for all his information. Using his own intuitive knowledge of geography, the few crude maps available, and the services of native guides, he felt his way through the country....

...One hour of observation from a light plane will give him a better idea of the country and its principal features than days or weeks of tedious foot exploration.<sup>38</sup>

Engineers such as Cron pursued technological mediation, ironically, as a way *into* nature. Phenomenological experience of the environment was precisely what was to be eliminated because of its potential to misguide the engineer. Technology offered a means

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<sup>37</sup> Rex H. Fulton, "Evaluation and Photogrammetry in Street and Highway Location," *Sixth Annual California Street and Highway Conference* (1954), 108.

<sup>38</sup> Cron, "The Art of Fitting the Highway," 85.

of better understanding nature and thus better integrating human society with the landscape.

It was the aerial view that made "efficient" routes such as Interstate-5 through the San Joaquin Valley possible. When interstate planning had been initiated in the 1940s, engineers had proposed that I-5 follow the route of Highway 99 through the valley, with the existing route upgraded to interstate standards. In the mid-1950s, however, California engineers proposed an alternate route down the valley's west side, which would reduce travel times between LA and San Francisco by as much as an hour. As discussions of the "Westside Freeway" were initiated, engineers delighted in the opportunity to build a freeway through "virgin country on entirely new alignment."<sup>39</sup> To escape the confines and mistakes of history was always the modernist hope.

The aerial view also became the principal means of publicizing modern highways to the general public. This was most obvious in Geddes's *Futurama* in which visitors were ensconced in moving seats positioned above the diorama and then told that they were embarking on a fifteen-minute simulated airplane ride over the America of 1960.<sup>40</sup> Somewhat less fantastically, the California Division of Highways printed aerial photograph's of new highway projects, and also photographed and exhibited various scale

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<sup>39</sup> M.E. Cornelius, "Highway Recollections," oral history transcript, August 1982, California Department of Transportation (Sacramento, 1982), 24, California Department of Transportation (Caltrans) Library, Sacramento, CA.

<sup>40</sup> Meikle, *Twentieth Century Limited*, 202.

models of proposed highways.<sup>41</sup> Here again, the size of these projects made the aerial perspective essential if one were to assimilate them. The public interest in these models was always high, and the response generally positive. They served as a kind of mini-Futurama and allowed an easy appreciation of sculptural properties and visual harmony while erasing or obscuring ground-level sensory experience: the effects on everyday life, noise and air pollution, the blocking of views and sunlight, and the mind-numbing effect of driving mile upon mile of relatively undifferentiated road. From the air, freeways did indeed look like rivers, gracefully flowing through the landscape. Writing in a somewhat celebratory vein about the LA Freeway system in the early 1980s, author David Brodsky corroborated the naturalizing effect of the aerial view:

Not only does the freeway shelter nature but, when viewed from a distance, it takes on a naturalistic quality of its own....[From high above] one views the freeway as one might watch the waves crashing at the beach, the traffic moving with an almost natural rhythm of ebb and flow.<sup>42</sup>

The popularization of the aerial view thus not only influenced the engineering design and location of freeways but also helped to mold a political and cultural consensus, however tenuous, concerning the place of freeways in the landscape.

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<sup>41</sup> "Sacramento Freeways Model Exhibited," *California Highways and Public Works* 43 (Mar. - Apr. 1964), 59; "Merit Awards," *California Highways and Public Works* 42 (May-June 1963), 61-62.

<sup>42</sup> David Brodsky, *LA Freeway: An Appreciative Essay* (Berkeley: University of California Press, 1981), 49.

As Brodsky quite consciously suggests and engineers already knew, good engineering both mimics and harmonizes with nature. Yet the alteration of nature on such a grand scale inevitably forced a reconsideration of the relationship between human beings and what Gregory Kepes had labeled "the new landscape." As Kepes formulated the connections among nature, machines, and bodies:

The technical landscape must be brought into harmony with the rhythms of the seasons, the breadth of the sky, the resources of the land. It must [also] be made to correspond to the biological and psychological requirements of men. Through our scientific knowledge, we are better aware of what those requirements are, and so begin to restructure the man-made world and restore the balance between us and our environment.<sup>43</sup>

Here Kepes echoes Mumford and other intellectuals of the nineteen-thirties. Technical knowledge and careful planning could create a new landscape and thus a new society. Modern engineering was not about the domination of nature and people but about their reconciliation. Yet the need to harmonize the modern landscape with nature *and* with human beings was not merely or even primarily the abstract concern of intellectuals, but also the pragmatic concern of engineers. As one highway engineer wrote, "Today the engineer is in an enviable position. He now has the skill and resources to shape a new environment."<sup>44</sup> In fact, engineers had consistently advocated freeways as a solution to

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<sup>43</sup> Kepes, *The New Landscape*, 74.

<sup>44</sup> Louis G. Kroeck, "An Engineer Looks at Aesthetics," *California Highways and Public Works* (Sept.-Oct. 1966).

the problem of automobile fatalities. Modern limited-access expressways represented a self-conscious attempt on the part of engineers to address the vulnerability of the body within the modern technological landscape. In this sense, freeways were quite literally, if somewhat paradoxically, a technology of the body as well as more obviously a technology of landscape.

More generally, the problems posed by automotive safety illustrate the ways in which engineers were forced to rethink and reconsider human beings and human bodies as they redesigned the landscape. Kepes's call to make the modern landscape "correspond to the biological and physiological requirements of men" was evident in much of the work of postwar highway engineers. Efforts to reduce accidents and improve highway safety led engineers and traffic researchers to consider human beings and the "man-machine relationship" in a variety of ways. As a result, postwar highway engineering became, to use Michel Foucault's language, one of the discursive sites of modernity in which human beings "problematize what they are."<sup>45</sup>

While safety campaigns in the pre-World-War -II period had focused on educating drivers, in the post-war period, researchers began to disaggregate their understanding of the human in an effort to better operationalize "human factors" for the purposes of research. They alternately studied driver psychology, sensory experience, and the physiology of the human body -- constantly recasting their definition of the *driver* and the *human* to better fit their own agendas. Gradually what had been defined

primarily as a "human " problem in the period before World War II, engineers redefined as a technological problem in the postwar era.

Concerns over automobile safety had emerged at least two decades earlier, in the 1920s. While the first automobiles had been introduced in the 1890s, and the first automobile fatality had been recorded in 1899, accidents only emerged as a serious concern as the automobile became widely available and affordable. The National Safety Council first compiled data on automobile deaths in 1906, in which they recorded 400, roughly equal to a rate of 0.5 per 100,000 people -- which suggests the relative insignificance of the automobile as a cause of death. But deaths rose steadily until 1931, when lower vehicle usage during the Depression caused a temporary decrease. Nineteen forty-one was a peak year in which almost 40,000 people were killed in auto accidents.<sup>46</sup>

Public concern over automobile accidents rose along with fatalities in the 1920s, a decade during which deaths increased from 12,500 in 1920 to 32,900 in 1930, an increase of 160%.<sup>47</sup> Safety advocates, highway engineers, and lay people alike perceived a mismatch between human beings and the automobile; they argued that human beings had not fully *adapted* to the new technological landscape. Commentators typically pointed out that automobile driving marked a radical departure from ordinary human experience and that consequently people were inadequately prepared to wield the new technology.

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<sup>45</sup> Michel Foucault, *The Use of Pleasure*, trans. Robert Hurley (New York: Random House, 1985), 10.

<sup>46</sup> David M. Baldwin, "Traffic-Accident Trends," in Highway Research Board, *Bulletin 74* (1953), 1-6.

<sup>47</sup> Baldwin, "Traffic-Accident Trends"; Foster, *From Streetcar to Superhighway*, 111.

For instance, Miller McClintock, the most well known traffic expert in the 1930s and director of the Bureau for Street Traffic Research at Harvard University, commented that "not only in *number*, but in percentage...defects in humanity run so far ahead of defects in the automobile as to make it instantaneously obvious that we have only ourselves to blame."<sup>48</sup> A commonly invoked statistic on the period claimed that "human error" was responsible for 90% of all accidents, while defects in the road or automobile accounted for only 10%.<sup>49</sup> When critics tried to analyze the source of human error, they concluded that the problems lay in physical or mental deficiencies, ignorance of automobile functioning and traffic laws, and poor attitudes.<sup>50</sup>

A plethora of didactic articles on automobile safety appeared in popular magazines, generating a series of state and local campaigns directed primarily at educating drivers and pedestrians about proper behavior and traffic rules. While critiques of safety did generate some improvements in automobile and road design -- safety glass, guard rails, and highway lighting, for instance -- the rhetoric of the period consistently returned to the need to modify human behavior. At the end of the 1930s, "driver training" courses were being offered, with the intention of inculcating good driving habits. Good driving had initially been seen as a result of physical fitness, technical knowledge, and a proper attitude, but by the 1930s, improvements in

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<sup>48</sup> "Human Nature vs. The Motor Vehicle," *American City* 45 (September 1931), 117; C.E. Pettisbone, "Educating the Driver," *Public Safety* (January/February 1930), 5.

<sup>49</sup> "Human Nature vs. The Motor Vehicle."

<sup>50</sup> J.S. Baker, "The Human Element in Automobile Accidents," *Public Safety* 12 (January 1929), 3-4.

automobiles and the expansion of service stations had rendered driving less physically demanding and technically simpler. As a result, *good* driving was increasingly seen as a set of personal characteristics. Popular critiques often focused on the problem of speed. Higher speeds were blamed for increasing accident rates, and commentators assumed that the problem lay in the inability of drivers to control their vehicles at high speeds.<sup>51</sup> But more generally critiques coalesced around the notion of the "reckless driver" -- the individuals who ignored traffic rules and speed limits and who showed a callous disregard for the safety of others.<sup>52</sup> On the one hand, educational programs had a clear disciplinary intent. They represented an attempt on the part of experts both to cultivate more socially appropriate attitudes and to force individuals to internalize mechanisms of bodily control that would allow a more harmonious existence between human beings and cars. But they also, somewhat more optimistically, assumed that human beings were ultimately in control of their automobiles. To assert that the problem was "human" was

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<sup>51</sup> Silas Bent, "Speed on the Highways: A Study of the Auto and Its Safety Problems," *Current History* 45 (December 1936), 95-99; William Junkin Cox, "Why Automobile Accidents?" *Harper's* 171 (June 1935), 54-66; "Safety: Now It's Up to the Man at the Wheel," *Literary Digest* 120 (9 November 1935), 31. Bent and Cox are also cited in Joseph Anthony Interrante, "A Moveable Feast: The Automobile and the Spatial Transformation of American Culture, 1890-1940" (Ph.D. diss., Harvard University, 1983), who summarizes some of the concerns over automobile accidents in the pre-1940 period.

<sup>52</sup> An interesting term of the period (the 1920s and 30s) used to designate automobile fatalities was "autocide." Although not universally accepted, the term was consistently used in publications of the National Safety Council and reflected the sense that the technology -- automobiles -- was somehow to blame, despite all the articles in the same publications that placed the blame squarely on individual human beings. It is suggestive of the ways in which the automobile was already blurring the boundaries between technology and human beings. "Autocide," *Public Safety* 13 (October 1930), 13; "National Word Hunt," *Public Safety* 13 (November 1930), 13.

also to assert the agency of humans in the landscape. This would change in the postwar period.

Yet despite such efforts at education, automobile-caused fatalities continued to rise, although their location shifted somewhat. Whereas in the 1910s and 20s, most accidents had occurred on city streets and killed pedestrians by the 1930s, most accidents occurred on highways and killed motorists. In fact between 1925 and 1935, highway deaths more than doubled. By 1941, 61% of all auto-related deaths occurred in rural areas.<sup>53</sup>

It was within this context that engineers began to advocate limited-access highways as a solution to growing concerns over automobile fatalities. Highway engineers were well aware that rural highway deaths were most often associated with cross traffic. Eliminating what they referred to as "crossings at grade" offered tremendous potential for reducing accidents. By the 1940s, engineers were consistently advocating limited-access highways as a pragmatic response to public concerns over safety and rising accident rates. In a remark typical of the era, one highway engineer wrote with exaggerated confidence, "Safety can be built into highways through correct design."<sup>54</sup> The principal means of "designing for safety," engineers asserted, was the elimination of cross traffic, i.e., the limited-access highway. It was precisely these

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<sup>53</sup> Baldwin, "Traffic-Accident Trends."

<sup>54</sup> R.H. Baldock, "Design for Safety," *Public Safety* 29 (February 1946), 8; Earl J. Reeder, "Building Safety into Our Rural Highways," *Public Safety* 16 (April 1933), 12-14.

concerns that led engineers in the California Division of Highways to turn their attention toward refurbishing and modernizing the Central Valley's principal highway. Highway 99 was the state's most dangerous road, and as traffic increased in the immediate postwar period, head-on collisions and sideswipes were an almost daily occurrence on certain sections. A 1946 Bureau of Public Roads report on California highways sharply criticized the design of Highway 99, calling attention to the distracting roadside development and inadequate right-of-way, and urging better planning and design.<sup>55</sup> The Division of Highways designated the upgrading of Highway 99 to full freeway standards as one of their priority projects in the immediate postwar years.<sup>56</sup>

Even as more freeways were constructed in the postwar period, however, engineers found themselves perplexed and frustrated by the persistence of accidents. Automobile deaths remained relatively constant, and highway accidents remained a major public concern.<sup>57</sup> In fact, freeways only heightened these concerns because higher speeds created more dramatic and horrifying accidents. The smooth, free-flowing and accident-free superhighways envisioned by Mumford and Bel Geddes remained a highly desired but still elusive goal. Engineers were quick to point out, somewhat defensively, that deaths per vehicle-mile were dropping, despite overall increases. They took some

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<sup>55</sup>George B. Gordon, "Some Observations on Landscape Development of Highways and Parkways in California," [1946], Caltrans Library, Sacramento.

<sup>56</sup>"Major Construction Projects," *California Highways and Public Works*, September-October 1948, 1, 16-18.

<sup>57</sup>"America Wants Traffic Safety," *Public Safety* 29 (April 1946).

comfort in the fact that increased fatalities represented increased automobile travel or increased "exposure" as they termed it. Rebutting arguments that insisted that speed was the principal causal factor in accidents, they insisted on the need to understand the multiple sources of accidents. This was partly defensive, as they were embarking on an unprecedented construction program for high-speed limited-access highways. If speed were indeed the source of accidents, freeways would only exacerbate the problem. Researchers produced numerous studies showing that fast drivers were, in many cases, also good drivers and that speed itself was not predictive of accidents. They emphasized that proper speeds were always context dependent, and that many serious accidents, particularly in urban areas, occurred at speeds of less than 40 miles per hour.<sup>58</sup>

Engineers remained convinced that a substantial reduction in accidents could be obtained through improved highway design, and, in fact, statistics supported this view. On a per-vehicle mile basis, limited-access highways showed a consistently better record, typically resulting in only one-half to one-third as many fatalities as highways without access control.<sup>59</sup> Moreover, engineers found that by redesigning "high accident locations" significant accident reductions were possible. By the mid 1950s, engineers

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<sup>58</sup> Roger G. Stewart, "Are We Over-Emphasizing Speed as an Accident Cause?" *Traffic Quarterly* 11 (October 1957), 573-79; Miller McClintock, "Speed," *Review of Reviews* 96 (July 1937), 49.

<sup>59</sup> Ralph A. Moyer, "Building Safety into California Highways," *Pacific Builder and Engineer* 64 (March 1958), 108.

were advocating a series of design measures to increase safety including many wide lanes, medians, easy curves and grades, and long sight distances.<sup>60</sup>

Yet even as engineers tried to focus increasingly on highway design, this inevitably led them back to the driver. Research repeatedly suggested that the road and the driver were inextricably connected. In order to design safer roads, engineers needed to know more about how individuals responded to particular design features. That the driver and road were intimately connected was illustrated by the long-recognized problem of highway monotony and "driver hypnosis," a term that had emerged in the 1920s to describe the phenomenon of otherwise healthy individuals entering a daze that allowed them to operate a vehicle but not to respond quickly to changing situations. Whereas pre-industrial travel had been experienced as physical exhaustion or even pain, with modern auto travel the problem was boredom and mental exhaustion.<sup>61</sup> Although post-war engineers eschewed the term hypnosis -- presumably due to its unscientific connotations -- their interest in the problem persisted, and they continued to investigate what they referred to driver "inattention," "loss of vigilance," or "skills fatigue." One

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<sup>60</sup> Rex M. Whitton, "The Role of Highway and Traffic Engineering and Highway Safety," *Traffic Quarterly* 19 (January 1965), 15; G.M. Webb, "Accident Study," *Traffic Engineering* 29 (October 1958), 18-20, 62. Louis Ward Kemp's article, "Aesthetes and Engineers" (note 31 above), initially suggested to me the usefulness of the Highway Research Board publications as a source for analyzing the ways in which highway engineers constructed both the "driver" and the human body.

<sup>61</sup> "Car-Drivers Who Suffer from 'Road Hypnotism,'" *Literary Digest* 69 (4 June 1921), 56-57. On the experience of pre-industrial travel, see Wolfgang Schivelbusch, *The Railway Journey: The Industrialization of Time and Space in the Nineteenth Century* (Berkeley: University of California Press, 1986), 1-15.

study concluded that driver inattention accounted for as much as 17% of accidents.<sup>62</sup> As one engineer wrote, "It is drowsiness and not [physical] fatigue that presents a danger on the modern expressway. With many autos now equipped with power steering and other conveniences, it is possible to travel many miles without muscular weakness."<sup>63</sup> But while engineers recognized that the monotonous designs of many modern limited-access highways were partly to blame for accidents, attempts to study and objectively define the problem of hypnosis/inattention were typically inconclusive.<sup>64</sup>

Elaborating on the insight that features of the road affected driver behavior, engineers attempted to measure the efficacy of specific road design features. For instance, several studies attempted determine an optimum shoulder width -- a critical consideration for highway engineers since acquisition of right-of-way was always the limiting economic factor in highway construction. Yet the evidence produced by such studies was conflicting. One California study found, for example, that under moderate traffic conditions accident rates actually increased along with shoulder width; yet another study found a direct correlation between increased shoulder width and decreased accident rates.<sup>65</sup> Again such studies led back to the driver. The critical question how drivers

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<sup>62</sup> Paul K. Eckhardt, "Role of Roadway Elements in Pennsylvania Turnpike Accidents," Highway Research Board, *Bulletin* 120 (1956), 1-5.

<sup>63</sup> Matthew C. Sielski, "How Road Users Appraise Roads," *Traffic Quarterly* 12 (January 1958), 110-11.

<sup>64</sup> D.A. Dobbins, D.M. Skordahl, A.A. Anderson, "Predictions of Vigilance," Highway Research Board, *Bulletin* 330 (1962), 9-14; Heinz Haber, Robert Brenner, and Slade Hulbert, "The Psychology of Trip Geography," Highway Research Board, *Bulletin* 91 (1954), 12.

<sup>65</sup> Libert Ehrman, "Causes of Highway Accidents: United States Experience," *Traffic Quarterly* 12 (January 1950), 42; P.M. Belmont, "Effect of Shoulder Width on Accidents on Two-Lane Tangents," Highway

*perceived* shoulder widths in different situations and how they modified their driving in response.

While focusing on the response of all drivers to highway design, researchers also attempted to identify and analyze problem drivers -- those most likely to be involved in accidents. As a group of experts from UCLA's Institute of Transportation and Traffic Engineering wrote, "The causative factor [in accidents] can well be sought in the physiological and psychological conditions underlying the behavior of the driver..."<sup>66</sup> Or, as another engineer wrote, the question "concerning whether it is possible to provide highway safety is: 'How can you better fit the driver...to his task?'"<sup>67</sup> This was the same question that people had been asking since the 1920s, but now engineers utilized a new set of techniques in order to answer it. Now the driver was an object of scientific study rather than simply the target of moral and educational exhortation. The reckless, accident-prone driver, they insisted, needed to be understood in social-scientific terms. Drawing on the techniques of postwar psychology, traffic specialists continued to investigate "driver characteristics," but rather than focusing on basic knowledge of traffic rules or the propensity to speed, they emphasized other hidden factors that might influence driving behavior, ranging from family background, to socio-economic status, to

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Research Board, *Bulletin* 91 (1954), 29-32. Also Stuart Wright and Robert B. Slaight, "Influence of Mental Set and Distance Judgment Aids on Following Distance," Highway Research Board, *Bulletin* 330 (1962), 52-57.

<sup>66</sup> Haber et al., "Psychology of Trip Geography."

<sup>67</sup> M. Earl Campbell, "Highway Traffic Safety: Is It Possible?" *Traffic Quarterly* 19 (July 1965), 348.

personality traits. Their emphasis was on how underlying human and social relationships might be revealed on the road. The leading schools of traffic engineering added psychologists to their staff and urged that the study of accidents be understood as an "interdisciplinary" problem -- requiring the skills not only of engineering and psychologists but also anthropologists, sociologists, and public health experts.<sup>68</sup> Driving habits were still assumed to stem from moral laxity, at least in some cases, but the hope now was to objectively identify reliable indicators that could be used to predict and control such problems.

A plethora of studies on "driver characteristics" appeared in technical journals, many of which drew on recently developed personality tests to rate drivers. Typically, early studies of this type found accident-prone drivers to be maladjusted in some way. As one study concluded, those drivers most likely to be involved in accidents were emotionally unstable, more aggressive, and likely to have had a history of family and social problems.<sup>69</sup> Another study of taxi drivers found that high-accident drivers had a significantly higher frequency of divorced parents, "excessive parental strictness and

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<sup>68</sup> L.M.K. Boelter, "Introductory Remarks Relating to Engineering Education at UCLA," *Sixth Annual California Street and Highway Conference*, 1954.

<sup>69</sup> D.J. Moffie, Andrew Symmes, and Charles R. Milton, "Relation Between Psychological Tests and Driver Performance," Highway Research Board, *Bulletin* 60 (1952), 17-24.

disharmony," frequent job changes, admitted sexual promiscuity, and a low interest in hobbies.<sup>70</sup>

But by the late 1950s, attitudes towards such psychological research were beginning to shift. Several studies seemed to show that there was no measurable difference between "habitual violators" and non-violators, while critics attacked such studies for their failure to specify adequately the variables under investigation.<sup>71</sup> In its imprecision and inconsistency, such psychological research fit uneasily within a profession that was defining itself increasingly in terms of narrow, technical objectivity. Moreover, even if research could illuminate and help identify problematic personality traits, it was not clear that such identification would facilitate meaningful change. Research frequently suggested that driver behavior remained opaque and idiosyncratic. As one engineer wrote rather pessimistically:

Driver training aids in judgment and skills, but motivations are not so easily trained. These are deep-seated and spring from personality traits, from physiological and psychological drives, from the mores of one's

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<sup>70</sup> Ross A. McFarland, "Human Factors in Highway-Transport Safety," Highway Research Board, *Bulletin* 60 (1952), 36-43. See also the articles in the following issues of the Highway Research Board *Bulletin*: 73 (1952), 120 (1955), and 152 (1956).

<sup>71</sup> Harry W. Case, Ismar Reiter, Ernst A. Feblowicz, and Roger G. Stewart, "The Habitual Traffic Violator," Highway Research Board, *Bulletin* 120 (1956), 31-36; Harry W. Case and Roger G. Stewart, "Driving Attitudes," *Traffic Quarterly* 10 (July 1956), 364-76; Goldstein et al., Highway Research Board, *Bulletin* 170; Brody, Highway Research Board, *Bulletin* 152. Leon Brody, "Personal Characteristics of Chronic Violators and Accident Repeaters," Highway Research Board, *Bulletin* 152 (1957), 1-2.

environment....before a person is old enough to driver, his personality is becoming fixed and not easily modified.<sup>72</sup>

While some psychological studies continued to appear, traffic researchers who focused on drivers shifted their emphasis to the development of more predictive driving tests and more quantifiable human responses. Frustrated with the inability of either standard road tests or personality tests to predict driving performance, engineers struggled to develop better means of screening drivers before allowing them on the road. Engineers placed considerably more emphasis on driving "simulators," a technology based on wartime aircraft simulation.<sup>73</sup> The move towards simulation was indicative of their preference for "objective" research and quantitative results. Simulators offered the possibility of laboratory experiments in which the driving experience could be varied in a controlled and measurable fashion. More significantly, such a move also reflected the influence of cybernetics and systems theory in the field of highway engineering.<sup>74</sup> Systems thinking was a product of wartime research into anti-aircraft defenses. Mathematician Norbert Wiener developed the term "cybernetics" to designate a new science and a new way of conceptualizing the relationship between men and their

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<sup>72</sup> Campbell, "Highway Traffic Safety."

<sup>73</sup> Slade Hulbert and Charles Wojcik, "Driving Simulator Research," Highway Research Board, *Bulletin* 261 (1960), 1-13, as well as additional articles in the same issue; A.R. Lauer, Vitrus W. Suhr, and Earl Allgaier, "Development of Criteria for Driving Performance," Highway Research Board, *Bulletin* 172 (1958), 1-8.

<sup>74</sup> Harmer E. Davis "Comments on Highway Planning and Research," *Twelfth Annual California Street and Highway Conference*, 1960, pp. 49-56.

machines -- and in the postwar period, cybernetics would be quickly extended into several academic fields, including biology and the social sciences.<sup>75</sup> Interaction between humans and machines was construed as "feedback" -- the transfer of information between entities. Blurring the human-machine boundary, cybernetics treated human nature as a black-box, and assumed that human beings were not fundamentally different from machines, at least from the perspective of the scientific investigator. Thus, for highway engineers, a systems approach made it unnecessary to understand the driver's motivation; the goal was merely to predict and reduce the potential for error. As Donna Haraway has aptly noted, what changes under cybernetic systems theory is the status of the living organism, whether human or animal: "What has gone definitively is the *privileged* status attending to life or consciousness. Organisms became biotic components, highly interesting, but not ontologically special in cybernetic systems sciences."<sup>76</sup>

True to the emphasis on systems thinking, simulation studies treated the human being as a black-box, a component of the technological system, and focused on communication between road and driver. Highway engineers spoke of the "complex interactions" among multiple variables: the driver, the vehicle, the road, and the surrounding environment, and began to formulate their problem as one of information

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<sup>75</sup> Peter Galison, "The Ontology of the Enemy: Norbert Wiener and the Cybernetic Vision," *Critical Inquiry* 21 (Autumn 1994), 228-66; Evelyn Fox Keller, "The Body of the New Machine: Situating the Organism between Telegraphs and Computers," in *Refiguring Life: Metaphors of Twentieth-Century Biology* (Cambridge, MA: MIT Press, 1996), 79-118; Paul N. Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (New York: Columbia University Press, 1986).

<sup>76</sup> Donna Haraway, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (New York: Routledge, 1989), 103.

transfer. What information did the driver need? How might that information be most effectively communicated? And how could differences in reception and processing be explained? As the authors of a major study on "human factors" argued, "The engineer must have an understanding of the sense organs and the characteristics of human perception if satisfactory information is to be supplied from signals and lights in the operation of equipment."<sup>77</sup> This discourse formulates the human contribution in cybernetic terms as a problem of information reception rather than one of "attitude" or psychological adjustment. For instance, engineers had long recognized the critical nature of driver vision, but now they referred not to eyesight but to "visual fields." They pointed out that the problem was not one's subjective visual ability (which could be easily measured and screened) -- even when drivers could technically "see" an object, they might nonetheless fail to "register" that object while driving at high speeds.<sup>78</sup> The effectiveness of the road, in other words, depended not so much upon *who* was driving but upon the effectiveness of visual communication.

Systems thinking assumed that human beings would inevitably commit "errors"; the challenge was to minimize their opportunity to do so, to delimit and proscribe the human contribution to driving. By the mid-1960s, most engineers had turned away from studying the driver and had returned their focus to the road and the vehicle, those parts of

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<sup>77</sup> Ross A. McFarland and Alfred L. Moseley, *Human Factors in Highway Transport Safety* (Boston: Harvard School of Public Health, 1954), 155.

<sup>78</sup> Barry G. King and Peter J. Sutro, "Dynamic Visual Fields," Highway Research Board, *Bulletin* 152 (1957), 3-14.

the system most amenable to engineering techniques. As Rex M. Whitton, head of the Bureau of Public Roads in the 1960s, wrote:

Accidents result from the fact that drivers are incapable of making errorless judgements and taking errorless actions. Thus, highway safety becomes a technological problem requiring improved engineering of both highway and the vehicle to reduce the possibility and consequence of human error.<sup>79</sup>

Simultaneously, developments in computer science encouraged exaggerated hopes for the elimination of human error from many realms of life, the freeway system not least of all. Taking their desire to limit human error to its logical extreme, many highway engineers expressed enthusiasm for the possibility of eliminating the driver altogether through the development of electronically guided cars.<sup>80</sup>

It is hard to avoid the conclusion that postwar highway engineers were operating with diminished concepts of human agency -- at least on the part of drivers -- an agency that they would seemingly have done away with if they could have. Moving away from efforts to understand the psychological motivations of drivers, they adopted the black-box model in which human motivations could not be understood even though human responses might still be predicted. Systems thinking embedded human beings ever more

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<sup>79</sup> Whitton, "The Role of Highway and Traffic Engineering," 15.

deeply in their (technological) environment; yet it was not only the human-environment or the human-machine boundary that was blurred but the very concept of difference between and among these components. The ultimate goal was to minimize error through the circumscription of human (and therefore error-prone) input.<sup>81</sup>

Within such a discourse, even the organic body comes to be constructed as a technological entity. Automotive design engineers operationalized human bodies quite literally as machines. They referred to "human sensory mechanisms" that were comprised of various "instruments": accelerometers in the inner ear, force and pressure cells in the skin, stress and strain gauges in the muscles.<sup>82</sup> At the same time, research turned toward quantifying the physiological (that is, mechanical) limits of the body. Engineers, in combination with physiologists, had begun to experiment in the mid-1950s with testing just how much impact the human body could withstand in particular crash situations. Automotive collision testing was also an outgrowth of war-related research, which had sought to determine the limits of the human body in combat situations. The first collision studies were conducted in the mid-1950s at UCLA. Researchers patched

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<sup>80</sup> E.R. Holmes, "Highway Transportation in the Years Ahead: A Challenge to Research," *Eleventh Annual California Street and Highway Conference*, 1959, pp. 1-5; Leslie E. Flory, "Toward Electronic Vehicle Control," *Twelfth Annual California Street and Highway Conference*, 1960, pp. 111-18.

<sup>81</sup> For instance, the author of a study on interchange design advised engineers to "make all necessary interchange and merging-diverging movements as simple and easy as possible. *Try to provide almost automatic driver operation and minimize compensating exercise of driver skill* [emphasis added]." George A. Hill, "Design of Rural Freeway Interchanges," typescript, talk presented at the World Traffic Engineering Conference, Washington D.C., 25 August 1961, Caltrans Library, Sacramento.

<sup>82</sup> William A. McConnell, "Human Sensitivity as a Design Criterion for Highway Curves," Highway Research Board, *Bulletin* 149 (1957), 34-43.

together their own test dummy out of mannequin parts, weighting them to approximate the weight distribution of a 157-lb man.<sup>83</sup> Intended to test automobile safety restraints, the authors also made explicate their desire to study the effects of rapid "deceleration" on the (male) body, or as another set of researchers described it, "the kinematics of passengers."<sup>84</sup>

Over the course of the late 1950s and early 1960s, collision testing received increasing attention. The Ford Motor Company initiated its own crash simulation work in 1965 and by 1967 was crashing between seven and ten cars every week. As a company executive wrote, collision research was yet another attempt to determine "how the driving function can be made more compatible with human capabilities."<sup>85</sup> But this was not quite accurate. Collision testing represented a fundamental shift in thinking. It suggested that researchers and engineers were accepting accidents as an inevitable part of

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<sup>83</sup> D.M. Severy and J.H. Mathewson, "Automobile-Barrier Impacts," Highway Research Board, *Bulletin* 91 (1954), 39-49. Despite the depth of the interest highway engineers showed in the human body, gender and/or women only rarely entered into their research agendas. A few early studies on driver characteristics noted the lower accident rate of women and some researchers noted that women's tendency to test as less "aggressive" correlated positively with better driving records. But all such studies pointed to women's much lower rate of "exposure" (i.e., they drove proportionately less than men), and interest in gender-based differences was minimal. When it came to issues of physiology, considerations of sex/gender were completely excluded from the research design. Discussions of fitting the car to the driver focused only on men. Crash-test dummies were modeled on the physique of the average white American male. For examples of psychologically oriented studies that did take gender into account, see A.R. Lauer, "Age and Sex in Relation to Accidents," Highway Research Board, *Bulletin* 60 (1952), 25-35; Leon G. Goldstein and James N. Mogel, "A Factor Study of drivers' Attitudes, with Further Study on Driver Aggression," Highway Research Board, *Bulletin* 172 (1958), 9-29; Hugh S. Penn, "Causes and Characteristics of Single-Car Accidents: Part I," Highway Research Board, *Record* 79 (1965), 1-16.

<sup>84</sup> A.L. Haynes, R.H. Fredericks, and W.J. Ruby, "Automotive Collision Impact Phenomena," Highway Research Board, *Bulletin* 142 (1956), 1-10; Charles A. Goodwin, "Automobile-Crash Injuries," Highway Research Board, *Bulletin* 120 (1956), 46-54; Highway Research Board, *Bulletin* 142 (1956).

their system rather than focusing on their elimination. The question was no longer how to make driving more compatible with human capabilities but merely how to specify the physical interactions between bodies and machines and how to reduce error to an acceptable level. In this thinking, human bodies were nothing more than particularly vulnerable machines. As the same executive went on to admit, the major goal was to "determine realistic values for the tolerances of the human body to injury from impact forces." Accordingly they recognized that a critical component of their research was the development of devices that could more "truly simulate the human body -- trauma-indicating dummies...."<sup>86</sup> The challenge was to build a better body-machine.

The move from studies of individual psychology to collision research was further evidence of the way in which engineers redefined the accident problem in narrowly technological terms. By mid-century, engineers saw the modern landscape as less a tool for shaping human beings than a goal in itself. In the construction of freeway systems, the issue became not so much how to produce a certain type of human being, and a certain type of society -- the implicit messages conveyed by Bel Geddes's *Futurama* or even by the Bureau of Reclamation's large dam projects -- but how to compel humans to adapt more fully to the new technology. It was now a matter of perfecting highway design and determining "tolerances" of the body to impact-induced injury. These were,

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<sup>85</sup> Colver R. Briggs, "The Ford Automotive Safety Research Center," *Traffic Quarterly* 21 (October 1967), 492.

<sup>86</sup> *Ibid.*, 495.

above all, technical problems, subject to engineering techniques of measurement and testing.

While by the mid-1960s engineering research consistently constructed drivers as nothing more than vulnerable and error-prone facets of a larger technological system, drivers, unlike machines, could speak for themselves. And many drivers experienced freeways as both threatening and confusing. As freeways had begun to proliferate in the mid-1950s, popular magazines presented article after article on how to negotiate freeway driving. Emphasizing the danger and unfamiliarity of high-speed driving and the risk of highway hypnosis, these articles confirmed that many Americans felt uncomfortable with the new freeway environment. Moreover, while lauding the freeways for their efficiency and for the territory that they opened up, most writers also subtly noted the ways in which freeways were experienced as confining. Particularly distressing to motorists was how easy it was to miss an "exit" and subsequently find oneself forced to drive miles in a direction that you did not want to go. As an article in *Good Housekeeping* put it, "Once on a superhighway, you are a kind of captive."<sup>87</sup>

It was urban planners who articulated concerns about the subjective effects of freeway systems with the most sophistication. Like engineers, planners emphasized the

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<sup>87</sup> Charlotte Montgomery, "Two Hazards: Speed and Monotony," *Good Housekeeping* 140 (April 1955), 26; N. Carlisle and L. Paris, "Stay Alive on Superhighways," *Science Digest* 32 (October 1952), 5-8; "How to Drive on a Superhighway," *Changing Times* 10 (June 1956), 13-15; S.T. Denis, "Secret of Superhighway Driving," *Parents' Magazine* 32 (August 1957), 112.

inter-relationship between the driver and her environment, the ways in which the landscape itself shaped experience and subjectivity. But while engineers had emphasized the ways in which highway design might control and contain subjectivity in order to make driving physically safer, planners sought just the opposite. Planners and architects criticized freeway design for its stultifying effects and urged highway designers to adopt "the view from the road," i.e., the view of the driver -- a direct challenge to the reliance on aerial views for highway planning. They viewed the modern freeway as a means of expanding the subjective experience of the landscape and imparting a new sense of autonomy and control to the person behind the wheel.

Christopher Tunnard and Boris Pushkarev, both professors of planning at Yale, suggested that it had been the railroad that had circumscribed human experience of the landscape by making the traveler a mere spectator who saw only a "man-made cross section of the surface of the earth." This is the phenomenon that Wolfgang Schivelbusch, in his discussion of nineteenth-century train travel, refers to as "panoramic perception," in which the perceived objects and the perceiving subject no longer occupy a common space. Instead, the viewer sees objects as they are framed by the apparatus that transports her.<sup>88</sup> By restoring agency to the driver, the automobile, Tunnard and Pushkarev argued, offered human beings the potential, as yet unrealized, to recapture an originary and sensual experience of movement.<sup>89</sup> They were excited by the visual and kinesthetic

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<sup>88</sup> Schivelbusch, *The Railway Journey*, 64.

<sup>89</sup> Tunnard and Pushkarev, *Man-Made America*, 159.

experiences that the automobile, in combination with good highway design, made possible. Landscape architect Lawrence Halprin similarly suggested that the automobile offered a means of reconnecting people with the modern landscape. According to Halprin, it was the act of participating in one's own movement -- pushing the gas pedal and turning the steering wheel -- that allowed people to make sense of an increasingly vast world:

These vast and beautiful works of engineering speak to us in the language of a new scale, a new attitude in which high-speed motion and the qualities of change are not mere abstract conception but a vital part of our everyday experiences. Though man is dwarfed by the size of these immense structures, he regains his relationship to them by participating in their use.<sup>90</sup>

Despite their optimism, the studies of Tunnard and Pushkarev, Halprin and others suggest that the proliferation of freeways had created an anxiety about the kinds of subjectivity implied by and experienced within these modern landscapes. Architecture critic Reyner Banham put the point more bluntly. Noting the paradox of a technology that was taken as a symbol of mobility and freedom, Banham wrote that the modern freeway system nonetheless required the population's "willing acquiescence in an incredibly demanding man/machine system."<sup>91</sup> Even though technologies may extend our engagement with the

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<sup>90</sup> Lawrence Halprin, *Freeways* (New York: Rheinhold Publishing, 1966), 17.

<sup>91</sup> Banham, *Los Angeles*, 217.

world and seemingly offer us an expanded sensory realm, they may also demand our acquiescence. Thus even while modern freeways seemed to promise new experiences of speed as well as access to new landscapes, the technology required and imposed excessive controls on those who participated in it. In a revealing passage, Donald Appleyard, Kevin Lynch, and John Myer -- members of the urban planning faculty at MIT -- wrote:

One of the strongest visual sensations is a relation of scale between an observer and a large environment, a feeling of adequacy when confronted by a vast space; *that even in the midst of such a world one is big enough, powerful enough, identifiable enough.* In this regard, the automobile, with its speed and personal control, may be a way of establishing such a sense at a new level. At the very least, it begins to neutralize the disparity in size between a man and a city....

...By making the motion of the car vivid with respect to the landscape, and the exterior spaces clear in their relation to the car's occupants, the highway designer can increase the driver's sense of mastery and connection [emphasis added].<sup>92</sup>

In this passage, Appleyard and his co-authors express the concern that the modern landscape threatens one's sense of control, and implicitly of masculinity. They invoke the familiar idea that it is phenomenological experience and interaction with the landscape which makes men, and yet it is precisely this interaction that engineers were seeking to

contain and eliminate on the modern freeway. When one experiences the landscape passively, as a floating, disconnected realm, identity -- perhaps particularly male identity -- is threatened.

Many postwar Californians experienced the Central Valley as just such a floating, disconnected realm. Freeways created a fundamentally new experience of the valley for both residents and non-residents. While reduced travel times brought places closer together and linked the valley much more tightly with the state's coastal cities, it also made it still easier to pass through the valley without actually encountering it. The freeways constructed in the valley held little connection with the landscape through which they traveled. In fact, freeways in the valley proved exceedingly dis-orienting even as they forced an unprecedented ordering of travelers' experience. For instance, after a freeway bypass of Fresno had been constructed on Highway 99, Caltrans undertook a study of drivers' orientation. In the late nineteenth century it would have been quite impossible for one to "miss" Fresno while traveling along the main road in the San Joaquin Valley, but that is precisely what began to happen once the bypass was completed. Motorists found themselves driving, often for miles, in the wrong direction. Their sense of directionality, space, and movement had been radically distorted by their mode of travel. When motorists expressed their disorientation, they said they did not know where exit ramps to the city were located, that they were confused by the signs, that

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<sup>92</sup> Donald Appleyard, Kevin Lynch, and John R. Myer, *The View from the Road* (Cambridge: MIT Press, 1964), 13.

they wanted more signs with, however, less information. As Reyner Banham aptly described the problem of orientation on the freeway:

At first these [directional] signs can be the most psychologically unsettling of all aspects of the freeway...but the sign must be believed. No human eye at windscreen level can unravel the complexities of even a relatively simple intersection...fast enough for a normal human brain moving forward at up to sixty mph to make the right decision in time, and there is no alternative to complete surrender of will to the instructions on the signs.<sup>93</sup>

Engineers quite predictably focused on the need for more consistent and clearer signs.<sup>94</sup> From their perspective, the problem was one of information transfer within the technological system. Drivers needed to be *told* where they were and where they were going. For bodies moving at speed and insulated from the external environment, location could be known only abstractly -- through words and symbols. (As Lefebvre suggests, one who knows only how to see ends up seeing badly.) Local residents also recognized the disconnection fostered by the freeway. In a somewhat ironic effort to counter such disconnection, the Bakersfield Kiwanis Club initiated the effort to place signs along the right-of-way fences identifying crops for the benefit of passing vehicles. To differentiate

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<sup>93</sup> Banham, *Los Angeles*, 219.

<sup>94</sup> David W. Schoppert, Karl Moskowitz, Slade F. Hulbert, and Albert Burg, "Some Principles of Freeway Directional Signing Based on Motorists' Experience," Highway Research Board, *Bulletin* 244 (1960), 30-87.

fig from peach trees at 60 miles per hour also required signs.<sup>95</sup> Such a move acknowledged that modern automobile travel had reduced the valley to a two-dimensional strip along the roadside which a driver might or might not register.

The modern freeway landscape posed challenges aside from orientation and disconnection from the landscape. It also altered bodily experience. The construction of Interstate-5 raised the problem of driver monotony to a new and often excruciating level. As one article noted, the first travelers on the new freeway were "neither mentally nor physically equipped to meet the challenges inherent in a trip where towns were non-existent, 60 miles of freeway separated service stations, and a 10-mile side trip was required to find a place to eat or sleep." Ironically, when initially planning this section of freeway, academics, engineers, and planners had exulted in the possibility of efficient travel and in the potential of a carefully planned environment. The relatively large amounts of right-of-way enabled planners to prohibit messy and undesirable roadside development and to locate several regional parks along the route.<sup>96</sup> The highway, they argued, would be both integrated with nature and would provide access to nature in the valley. Yet once the route opened, some drivers actually suggested that a few billboards -

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<sup>95</sup> "Form vs. Function," *Fresno Bee*, 4 May 1977.

<sup>96</sup> M.E. Cornelius, "Westside Progress: Construction Starts on New 321-Mile Interstate 5 Route," *California Highways and Public Works* 42 (Sep.- Oct. 1963), 27-31. The parks were eventually eliminated during the administration of Governor Reagan. See Herbert M. Goodwin, Jr., "California's Growing Freeway System," (Ph.D. diss., UCLA, 1969), 293.

- the bane of the early modernist planners -- would enhance the landscape and help to break up the monotony.<sup>97</sup>

It is perhaps too obvious that freeways confined and narrowed experience of the landscape even while making it possible for individuals to "see" (but perhaps not to "register") ever more territory. If we return to Lefebvre and the idea that spaces are culturally produced, we can see that, in a sense, the opposite was happening. As spaces are produced to serve certain pragmatic and ideological needs, so they can also be disassembled. The valley had, at one time, been produced as an agrarian space that would ultimately legitimate white occupation of the Far West. In that process, the valley would serve as both the repository and the source of key cultural values. But in a sense, that valley began to fall off the map in the postwar years. Now American cultural legitimation was to be embodied in modern technological projects and an urban civilization. Whether or not they shared in this project, most Californians now experienced the valley, if they experienced it at all, as a series of speeding freeway signs and a flat landscape requiring five or six hours to traverse. The "modernization" of agriculture in the valley was, of course, related -- but while the valley could itself be modernized, it did not longer serve the same pre-eminent cultural role. Freeways helped to reconstitute the valley as a space of travelling rather than dwelling. That the valley no

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<sup>97</sup> Interstate 5's New Lonely Link-Up," *Sunset* 148 (May 1972), 71; "The Westside Freeway: Changes Occur During First Year of Operation," photocopied article file: "Highways - Interstate 5," Caltrans Library, Sacramento.

longer has the same hold on the American cultural imagination as it once did has as much to do with changes in American culture as with changes in the valley itself.

The role of the modern freeway in impoverishing our experience of the landscape became the subject of several American photographers in the 1970s. In the photograph *Albuquerque*, taken in 1975, James Hajicek aligns three shots of a freeway vertically: one taken from the left hand side of the road, one from the center, and one from the right.<sup>98</sup> In each case, he places the horizon high, so that the empty roadway consumes most of the frame, indicative of the freeway's consumption of the landscape. In the far distance an overpass of the most functional and nondescript type provides the photograph's principal focal point. The artist exploits the small differences in view and perspective that the road affords, but this diversity only emphasizes the scene's unrelenting sameness. We can peel off to the right, taking the exit – but that will only place us on a similar highway it seems, going in another direction, and we would hardly know the difference -- although, of course, we can expect a sign to inform us of our new direction. The little interest that these photos hold lies in the roadbed on the side. There the strip of unpaved dirt offers us the potential of a sensory engagement with the world. Walking on the side of the road, feeling and hearing the rocks under our shoes, seems imminently preferable to driving mile after mile of undifferentiated road.

Benno Friedman's *Untitled (Freeway Overpass in Fog)* taken in 1976 offers us a similarly bleak appraisal of the modern freeway.<sup>99</sup> The photograph shows an unnamed divided highway with three vehicles visible, the closest one about to pass under an overpass, equally as generic as the one appearing in Hajicek's *Albuquerque* photo. The landscape is flat, and Friedman has carefully framed the picture so that the overpass parallels the frame edge. The same right angles are mimicked by road signs in the distance. We see these signs from behind, so we don't know what they say. But we can easily guess: mileages, speed limits, perhaps the fine for littering. Friedman's photograph forces on us the uncomfortable knowledge of just how *well* we know the freeway landscape. The straight lines of the road edge and inner lane line lead us into the picture, but also out of the frame; Friedman has inverted the conventions of pastoral landscape painting in order to give us a landscape that is unbalanced and disharmonic. Instinctively we don't want to follow the lines into the photograph. The dullness is unbearably oppressive: monotony, repetition, concrete, and grayness are all that lie ahead. Though the geographic location of the photo is no where revealed, it might well have been taken in the Central Valley, well known for its fog and monotonous interstate highway. But the point here is the very anonymity of the landscape despite the (over)familiarity of the scene.

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<sup>98</sup> James Hajicek, *Albuquerque*, 1975, cyanotype, Henry Art Gallery, Seattle.

<sup>99</sup> Benno Friedman, *Untitled (Freeway Overpass in Fog)*, 1976, hand-colored gelatin silver print, Henry Art Gallery, Seattle.

There is a paradox here -- between the experience of detachment, even alienation, suggested by these artists and the ways in which the mid-century highway research literature consistently emphasized the connection between the body and the landscape. Reading the mid-century literature on highway design, one comes away convinced of the interpenetration of driver and highway, technology and nature. In their writings, engineers moved back and forth between road and driver, natural topography and highway curvature, freeway signs and visual fields. They took the human body, and they took nature, into account. There are resonances in their work of the way in which nineteenth-century individuals recognized the interpenetration of landscape and bodies when they discussed miasma or horticulture. But what was different was the control that engineers now exerted over the landscape and those who traveled through it. Reciprocity was not the operative principle. The agency of engineers had, in a sense, displaced that of drivers. Their focus on the body and all of its inadequacies ultimately led them to circumscribe human engagement with the natural-technological landscape they were creating. They no longer believed that human beings could be engineered like the landscape, but they hoped that human actions could be more finely circumscribed and the vulnerability of human bodies taken into account. By the late twentieth century, certain environments had become so controlled and highly mediated that a body might barely register them as experience. That, in fact, was the lesson of driver hypnosis.

### *Conclusion*

Since the mid-nineteenth century the history of the Central Valley has been, from one perspective, a history of attempts, ever more radical, to perfect and to "finish" the natural environment. In this thinking, while the environment itself dictated possibilities, it was up to human beings to realize the inherent potential of the landscape. Anxious about their immigration to an unfamiliar place, nineteenth-century Anglo-Americans believed that their successful occupation of the Central Valley hinged upon their ability both to understand and to carefully remake the new environments that they encountered.

The discourse of finishing underscores the ways in which Anglo-Americans have seen themselves imbricated within the non-human world. As human beings remade nature, they were, in turn, affected by nature. They understood the relationship as reciprocal. While it is easy from the perspective of the late twentieth century to read the environmental history of the region as one of the human conquest and domination of the natural world, such a story oversimplifies the cultural history of those who have actually set out to transform the valley into a livable and productive space. It is not only the work of capitalism and bureaucratization that defines and creates a particular space, but the experience and understandings of embodied individuals. Attempts at environmental finishing have always been bound up with a complex cultural history. As I have tried to

suggest, at the root of such efforts has lain concerns over the vulnerability of the human body and the corresponding desire to harmonize bodies, at least certain bodies, with their surrounding environment.

The transformation of the valley over the last century and a half has coincided, however, with changing understandings of the human body. New discourses of work and labor, of disease, of gender, of race, of cybernetics have all influenced understandings of human bodies and human beings in different periods. I have tried to point to some of the ways in which these discourses about the body have been tied up with discourses about, and responses to, the landscape of the Central Valley. In discussions of traveling, horticulture, disease, and engineering, understandings of human beings have been related to and resonant with understandings of nature.

By focusing on the perceived connections between human beings and the environment, this history reveals again the inadequacy of a historical paradigm of domination, which interprets environmental change to be the successful outcome of a generalized Euro-American desire for conquest. Such a paradigm both denies the potential agency of those who live within such highly engineered and administered spaces and also exaggerates the human ability to control the natural world. In the case of the valley, the unintended consequences of alienation produced by works of modern engineering would eventually help to enable a critique of the region's history. In the 1960s and 1970s, environmentalists in particular would begin to decry the history of the valley as one in which the human use of nature had rendered the landscape toxic to animals and human beings and devoid of vibrant natural or social communities, and the

shared experience of Interstate-5 would serve to underwrite such criticisms. Moreover, concerns over the impacts of water projects and agricultural practices on wildlife and human health would increase throughout the 1960s and 70s, ultimately becoming potent political issues. Much of the power of environmentalism as it emerged in the 1960s in the valley and elsewhere lay precisely in the continuing recognition that human beings were ultimately part of and subject to their environment, an environment that was becoming increasingly polluted and palpably dangerous. The local struggle for farmworker unionization in the 1960s, for instance, invoked a critique of pesticide exposure.<sup>1</sup> And in the 1980s, national attention was focused on regions of the San Joaquin Valley where high levels of organic chemicals in groundwater were correlated with a higher incidence of rare cancers.<sup>2</sup> Much like the nineteenth-century concern over irrigation and miasma, concerns over chemical pollution suggested that transformations in the valley's environment might have unexpected consequences that would ultimately be registered in human, and in bodily, terms.

Environmentalism resonated with historical understandings of the valley in another important respect. Much like nineteenth-century horticulturists, modern environmentalists enunciated a strong vision of what the valley *should* look like, and they presumed their own visions to be authorized by "nature." In the 1980s and 90s

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<sup>1</sup> Laura Pulido, *Environmentalism and Economic Justice: Two Chicano Struggles in the Southwest* (Tucson: University of Arizona Press, 1996), 57-124; Robert Gordon, "Poisons in the Field: The United Farm Workers, Pesticides, and Environmental Politics," *Pacific Historical Review* 68 (February 1999), 51-77.

<sup>2</sup> California Department of Health Services, "Epidemiologic Study of Adverse Health Effects in Children in McFarland, California – Draft Phase II Report," 19 January 1988.

environmentalists would embark on their own projects of finishing as well, although they would often refer to these efforts as "restoration." Despite the difference in semantics, they shared a goal with many of the agriculturists and engineers who had preceded them: to rework the environment that they encountered in accordance with a particular vision and a set of higher principles that could be read from the landscape itself.

Yet environmentalist visions of the valley broke with those of their agrarian and modernist predecessors in at least two important ways. Most obviously, environmentalist visions of the valley were inescapably nostalgic. Many urban and some rural Californians viewed the valley as an environmental paradise lost. From this perspective, however partial, the valley had once been a massive wetland teeming with fish and wildlife, and was now awash in pesticides, toxic metals, and invasive, non-native species; meanwhile, many pre-existing environments had all but disappeared. While utilizing the knowledge and techniques of the most modern science, projects of environmental restoration sought to return the valley's landscape to a past time, most typically to the point at which white colonization had just begun. Refusing to recognize their relationship to what had come before, environmentalists sought to erase a century and a half of history. This was a type of finishing that refused to recognize itself as such.

At the same time, most, if not all, environmentalists assumed and sought to maintain a clear division between the human and the natural, at least in certain places. They critiqued modernist projects for the ways in which they had interfered with and altered the valley's "natural" processes, pointing particularly to the ways in which hydrological engineering had destroyed the region's earlier aquatic and riparian

landscapes. At various points, environmental groups sought to alter contemporary water management practices, to extinguish introduced species, and to remove agricultural land from production, claiming that these were "unnatural" and at odds with the valley's pre-existing ecology. They understood the modern valley not as a natural-technological hybrid nor as a literally and figuratively constructed space in which they were also implicated, but as an artificial creation that had, in many places, completely obliterated a pre-existing natural world. Invoking the authority of nature, environmentalists argued that certain sections of the valley should not have been inhabited at all, or at least not converted to cultivation because such human habitation was unavoidably destructive and ecologically unsustainable. While many of their criticisms were convincing and well founded, their perspective was distinctly ahistorical.

Thus, while certain environmentalist understandings reasserted the connection between human bodies and the environment in a way that nineteenth-century Americans might well have grasped, other understandings positioned human beings, and Anglo-American history, outside of, and in opposition to, the valley's non-human nature. Ironically perhaps, it was in this insistence on the separation between human beings and the landscape that environmentalism, at least in certain variants, departed most clearly from earlier understandings of the Central Valley.

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