LEVIATHAN IN THE TROPICS: A POSTCOLONIAL ENVIRONMENTAL HISTORY OF THE PAPALOAPAN DEVELOPMENT PROJECTS IN MEXICO

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A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

2011

To everyone who has helped along the way

ACKNOWLEDGMENTS

I would like to thank my dissertation advisor, Mark Thurner for guiding me through institutional, intellectual, and metaphorical jungles of graduate school and the Mexican tropics. I would also like to thank members of my Committee, Luise White, Carmen Diana Deere, David Geggus, and Michael Heckenberger for their advice and encouragement. I would also like to thank Romana Falcón from the *Colegio de Mexico* for her patience and willingness to meet with a gringo still learning to navigate Mexico City's busses. Thank you, also to Antonio Escobar Ohmstede from the *Centro de Estudias y Investigaciones Superiores en Antropología Social* (CIESAS) for helping to shape my study at an early stage and for making Mexico City a welcoming place to work. I would like to thank Jorge Andrade and the staff at the *Archivo Historico del Agua* (AHA) for their generosity and collegiality, and the staff at the *Archivo General de la Nación* (AGN), the *Biblioteca Daniel Cosío Villegas* at the *Colegio de México*, and the *Biblioteca Central de la Universidad Nacional Autónoma de México* (UNAM). Closer to home, enthusiastic assistance from Richard Phillips and Paul Losch from the University of Florida Latin American Collection has been invaluable at every stage of this project. The research for this study would not have been possible without the generous support of The Tinker Foundation for a Field Research Grant, Phi Alpha Theta National History Honor Society, the Department of History (for the Roger Haigh Latin American History Award and the George E. Pozzetta Research Award) the Center for Latin American Studies Center and the College of Liberal Arts and Sciences.

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May 2011

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Major: History

This dissertation is a critical environmental history of one of the largest development projects ever pursued by the Mexican state. Between the 1940s and the 1970s, Mexican policy-makers that sought to transform tropical nature and indigenous peoples as productive subjects of the nation. As a pioneering example of the application of using “Green Revolution” agricultural techniques and modernist social science, the Papaloapan Projects provide an excellent case study for considering environmental, political, and social change in Latin America and the postcolonial world at large. By drawing together insights from Environmental History, Postcolonial Criticism, and Subaltern Studies, this study makes an interdisciplinary contribution to the historiography of twentieth-century Mexico.

INTRODUCTION

This study is a history of the Mexican state's high modernist project to remake the Papaloapan River valley and its peoples. The Papaloapan Projects were launched in the 1940s as modern scientific means to control the devastating floods caused by the unpredictable seasonal rains of the tropics. However, government planners, engineers, social scientists, and agronomists soon undertook a much more ambitious program -- spanning four decades -- that sought to bring the unruly tropical environment and its "backward" people into the modern nation. I examine this "tropical Leviathan" of state-led development and nation-building from a critical historical, postcolonial, and environmental perspective.

In examining the Mexican government's grand development programs in the Papalaopan Basin, I hope to accomplish two things. First, I hope to contribute to critical theoretical discussions of development by deploying insights and theories developed in the fields of environmental history and postcolonial studies. I argue that the case of Mexico offers a modular opportunity to connect the concerns and methods of environmental history with those of postcolonial and subaltern studies. In a moment when environmental historians in the United States seek to expand their horizons to the developing world, I suggest that the insights from postcolonial scholars are well worth considering. Here I follow Andrés Guerrero's charge to rethink "models" in theory and history from the global south. Although its architects were inspired in part by the high modernist development projects of the Tennessee Valley Authority in the United States, the Papaloapan Projects may be taken as a "model" for thinking about state-led development and its dissent anywhere in the world.

Second, I hope to contribute to a rethinking of the nature of the Mexican one-party state and the forms of dissent it gave rise to. In this regard, I propose that the Mexican state under the *Partido Revolucionario Institucional* (PRI) neither fulfilled the promises of the Mexican Revolution for rural peoples, as state officials argued, nor wielded authoritarian and hegemonic power, as its many detractors have claimed. Instead, efforts to extend state power into the tropical south faced considerable challenges from both the natural world and from critics who mobilized against state development projects and who questioned the underlying assumptions and discourses that guided state planners. It is not my purpose here to emphasize or necessarily explain the Papaloapan Commission's "failure" to develop the tropical lowlands. Instead, I hope to reveal the fragility of the one-party state and the multiple channels for dissent that emerged over the course of the projects. I suggest that the strong opposition to the Papaloapan project should cause us to reevaluate dominant narratives not only about the state but also about environmentalism in Mexico.

Environmentalism in Mexico (like much else) is often considered to be a state initiative "from above." Some scholars argue, for example, that Mexican President Luis Echeverría initiated environmental legislation without pressure from a strong environmental movement. Others have noted that the rise of environmental consciousness has been a middle-class response to pollution in Mexico City and other industrial cities. Still others have suggested that Mexican environmentalism emerged "from below" with the "new social" and "indigenous rights" movements that sought to challenge the neoliberal reforms of the 1980s and 1990s. Nevertheless, critical social concerns about environmental degradation, and a serious reevaluation of indigenous

knowledge were an integral aspect of the history of the Papaloapan projects. As the state's faith in scientifically-informed and commercially-driven agricultural development came under fire by activists and communities, agronomists re-evaluated the value and effectiveness of indigenous land use techniques. In short, the history of the Papaloapan project suggests a revision of the standard narratives of the emergence of environmentalism in Mexico.

This study is primarily concerned with understanding discourse deployed by the central Mexican state as it attempted to extend its reach into the tropical regions of southern Mexico. It is not a quantitative study of development in the Papaloapan Basin and makes no attempt to chronicle "changes in the land" as government public works projects and agricultural development transformed the region. Specialists in economics and agronomy have conducted extensice research documenting the transitions initiated by the Papaloapan Commission and the Rockefeller Foundation scientists.[1] I do not seek to replicate their work. Without doubt, their collection of statistical data and their analysis was meticulous and rigorous according to the conventions of their respective academic disciplines and the assumptions that underpinned their theoretical and interpretive models. It is precisely those conventions and assumptions that this study examines as it and explores the complex interactions between science and state power.

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[1] See, Jose Attolini, *Economia de la Cuenca del Papaloapan,* 2 vols. (Mexico City: Instituto de Investigaciones Economicas, 1949); Winnie, "The Lower Papaloapan Basin;" Thomas Poleman, *The Papaloapan Project: Agricultural Development in the Mexican Tropics,* (Stanford: Stanford University Press, 1964); Juan Ballesteros, Matthew Edel, and Michael Nelson, *La Colonizacion en la Cuenca del Papaloapan: Una evaluacion socioeconomic,* (Mexico City: Centro de Investigaciones Agrarias, 1970); Peter T. Ewell and Thomas T. Poleman, *Uxpanapa: Agricultural Development in the Mexican Tropics,* (New York: Pergamon Press, 1980); Sara J. Scherr and Thomas Poleman,, *Development and Equity in Tropical Mexico: Thirty Years of the Papaloapan Project,* (Ithaca: Department of Agricultural Economics, 1983); Jose Noriega, *Control del Río Paploapan: Preparación del plan de estudias definitivas y programas de construcción de obras, Infrome Detallado,* (Mexico City 1973).

This study is also not an ethnography of the indigenous groups displaced by the works of the Papaloapan Projects, or of the workers who constructed and maintained the complex network of dams, canals, and roads. Again, there are a number of studies that have attempted to chronicle the local processes of social change.[2] As fascinating and informative as those processes are, I do not attempt to trace them here. Instead, I am interested in the prevailing anthropological discourses that informed ethnographic studies and linked them to state discourses of national development. This study is also not a "struggle story" that chronicles the rise of social movements for environmental justice or indigenous rights. Instead, I hope to chart how politically-salient languages of development and environmental responsibility changed over time and made new social movements possible.

Chapter Outlines

In Chapter 1, I outline a theoretical framework that combines insights from environmental historians and postcolonial scholars who investigate the ways in which knowledge is constructed and deployed to buttress regimes of power. I argue that the Mexican state attempted to bring tropical nature and tropical peoples into the nation by justifying interventions into the region using assumptions of fecund tropical environments and correspondingly backwards, lazy tropical people. Such assumptions resonated with long-held assumptions about tropical nature.

[2] See especially, Alfonso Villa Rojas, *Los Mazatecos y el problema indgena de la Cuenca del Papaloapan,* 2 vols. (Mexico City: Instituto Nacional Indigenista, 1955); David F. McMahon, *Antropología de Una Presa: Los Mazatecos y el proyecto del Papaloapan,* (Mexico City: Instituto Nacional Indigenista, 1973); Alicia Barabas and Miguel Bartolomé, *Hydraulic Development and Ethnocide: The Mazatec and Chinantec People of Oaxaca, Mexico,* (Copenhagen: International Work Group for Indigenous Affairs, 1973).

Chapter 2 situates the history of the Papaloapan projects within the historiography to rethink narratives and periodizations of the Mexican state. The goal is not to simply apply "some already settled methods to a new set of archives and [add] the results to the existing collective wisdom of historiography."[3] Rather, a postcolonial approach to environmental history in Mexico unsettles traditional political narratives about the dominance of the one-party state and the variegated forms of discontent to which it gave rise.

In Chapter 3, I describe the origins of the Papaloapan River projects as an official response to the threats from floods and the newly perceived opportunities presented by tropical nature. I look closely at the language deployed by Mexican officials to justify bringing the Papaloapan Basin and its people into the modernizing nation. Although state efforts ultimately languished as a result of decreased federal funding, increased fighting among various government agencies, and the unwillingness of local people to conform to government dictates, they did establish the authority of scientific knowledge to discursively order nature and culture.

Chapter 4 examines the work of social scientists that justified intervention in the region, and simultaneously facilitated the specific *forms* of the development projects. When President Miguel Alemán initiated the Papaloapan Projects, officials and scientists knew very little about the basin. Researchers from Mexico City poured into the region to catalogue the flora and fauna so as to determine the best strategies for economic development. Anthropologists working under the guidance of the *Instituto Nacional Indigenista* (INI), took a new interest in the indigenous groups of Oaxaca,

[3] Dipesh Chakrabarty, *Provincializing Europe: Postcolonial Thought and Historical Difference,* (Princeton: Princeton University Press, 200), 107.

particularly the Mazatecas and Chinantecas of the upper Papaloapan basin. Ethnographers were interested in examining indigenous culture to describe, and explicitly to *facilitate*, the decline of traditional folkways and the transition to modernity.

The state's efforts to transform peasants in Oaxaca into modern farmers represented only one aspect of a broader effort to modernize Mexican agriculture according to the dictates of science and commerce. Chapter 5 places government programs in the highlands of Oaxaca in the context of modernization projects informed by "Green Revolution" technologies developed as the result of collaboration between the Mexican government and the Rockefeller Foundation. The Rockefeller Foundation brought new credibility to the science of agronomy in Mexico and led researchers to address social problems by defining problems specifically in terms of puzzles that science could resolve. In particular, a perceived crisis of food shortages led scientists to focus narrowly on increasing production. Resistance to government modernization and development schemes first emerged the project's subjects began to experience the negative consequences of using hybrid seeds that required massive amounts of costly chemical fertilizers, pesticides, and irrigation.

In Chapter 6, I describe the new forms of peasant political mobilization that emerged as the state attempted to revitalize the Papaloapan projects in the early 1970s. By then, an amorphous coalition of students, scholars, and local actors opposed state development projects. This coalition decried the environmental devastation of large-scale public works, and it celebrated indigenous knowledge as an alternative to big science. Rather than uncritically championing indigenous knowledge and environmental practices, I examine the 1970s as a historical moment in which new

languages of environmental stewardship challenged older scientific discourse about the efficacy of modern agricultural techniques. In the Conclusion, I argue for the utility of a critical postcolonial environmental history that does not celebrate “indigenous knowledge” or “new social movements” and which also does not enshrine a Leviathan that was always weak and fragmented when it came to remaking nature and culture in the Mexican hinterland.

Notes on Sources

I first traveled to Mexico City in June 2006. On the advice of Antonio Escobar Ohmstede of the *Centro de Investigaciones y Estudias Superiores en Antropología Social* (CIESAS), I visited the *Archivo Historico del Agua.* Touring the archive, I was shown a large collection of documents from the Papaloapan Commission. Until recently, the Commission’s archive had been sitting in Veracruz, before conscientious scholars and preservationists rescued the collection from the humid tropics and transferred it to Mexico City. Since then, the archive’s staff has been slowly making documents available to researchers. When I returned to Mexico in 2008, it was encouraging to see students and scholars from the national university, (*Universidad Nacional Autonoma de Mexico* - UNAM) working diligently and collegially in the archive’s reading room. Many were investigating the wonderful photograph collection, or researching the grand works of the laborers who constructed the Miguel Alemán Dam and the roads and irrigation canals that crisscrossed the basin.

Settling in to work, I found that many of the documents from the Papaloapan collection were not yet available to researchers. They remained stored in boxes while the staff attempted to catalogue and preserve the delicate paper – often gossamer-thin carbon copies of official state correspondence. As I conducted my research, only some

2000 of the 40,000 documents, photographs, and reports from the collection had been preserved and catalogued. Nonetheless, the *Fondo de Papaloapan* at the *Archivo Historico del Agua* served as the most important reservoir of sources for this study. I was able to access official government proclamations, reports and correspondences from Papaloapan Commission officials and engineers, and petitions to the Commission and the federal government from people demanding indemnification or compensation for damages to their property – especially their fruit trees. I also had access to the small but excellent library housed at the archive. The library collection contained almost all of the academic work sponsored by the federal government and the Papaloapan Commission. Others could be found a short metro ride away in the collections at UNAM or the *Biblioteca Daniel Cosío Villegas* at the *Colégio de México.*

Published academic work provides much of the material for Chapter 4. However, I have tried to avoid reading such studies as transparent windows into the world of the past. I avoid using economic, botanical, or ethnographic studies in order to establish a baseline from which to evaluate the changes introduced by the work of the Papaloapan Commission. When the Commission began its construction projects, the Papaloapan Basin was already in transition. Though the region was less influenced by the anti-clerical battles of the 1920s or the agrarian reform of the 1930s, the Mexican Revolution brought important changes to the region. The Papaloapan Commission, and the scholars it employed to predict and promote economic development, tried to accelerate the process of integrating the residents of the southern tropics into the modern nation. They were outsiders with their own assumptions about tropical nature and tropical

people. They deployed an academic, scientific discourse to construct tropical people as objects in need of study and state intervention.

Though I have relied heavily on the Papaloapan Collection in the *Archivo Historico del Agua,* because of the limitations imposed by the ongoing process of preservation, I have supplemented those official sources with federal government collections in the *Archivo General de la Nación* (AGN). The presidential papers of Miguel Alemán and Luis Echeverría were particularly helpful, as was the official organ of the Mexican government, the *Diario Official*. Newspaper accounts of travelers, both Mexican and American, were important for constructing an image of the Papaloapan basin and its people according to preconceived assumptions about “the tropics” that justified state intervention.

CHAPTER 1
RETHINKING LEVIATHAN IN THE TROPICS

During the past decade, two of the more influential historiographical movements of the twentieth century, environmental history and postcolonial studies, matured, and reached points of crisis. Scholars from both movements have wrestled with the problem of breaking free of the modular geographic and theoretical boundaries that have characterized the academic discipline of history in the United States and Europe. Increasingly, both environmental historians and postcolonial scholars have expanded the applicability of their fields beyond their initial spatial and temporal limits. Environmental historians have repeatedly proclaimed the need to expand their studies beyond the borders of the United States, though they have shown little inclination to engage with theoretical insights and historiographies from other regions. Much of the work on environmental history is often, unconsciously perhaps, shaped by research agendas first established among U.S. environmental historians, which are then projected onto other places.

In contrast, postcolonial scholars have criticized and deconstructed Euro – and U.S. - centric narratives of history, developing theoretical insights derived from British and French decolonization movements in Asia and Africa, and from the global diaspora of postcolonial intellectuals. Notably, Latin Americanists have engaged in a critique of this critique, asserting that the British and French cases have tended to subordinate the postcolonial history of the Americas. Notably, in both the environmental history and postcolonial studies, Latin Americanists figure prominently in recent debates. Nevertheless, there have been relatively few attempts to engage U.S.- centric environmental history from a Latin Americanist postcolonial perspective that challenges

the ways in which knowledges of nature have been constructed and deployed.[1] Although, postcolonial scholars concerned with processes of state formation, domination, or subjugated, subaltern knowledges in Latin America have often focused on popular and political culture, they have tended to ignore the ways in which concepts of nature buttressed state projects that attempt to assert hegemony.

In this study, I propose that postcolonial investigations of the relationship between the construction of environmental knowledge and the exercise of political power are useful for understanding how tropical places and people are discursively constructed in ways that facilitate both state intervention and the critique of the intervention. My goal here is something other than recovering "hidden histories," or writing a "history from below." Following William Roseberry's charge to move beyond the "agrarian question" that narrowly focuses on the organizational potential of peasant politics, I examine what Foucault calls "the insurrection of subjugated knowledges," which unsettle objective claims to scientific truth, and upset teleological notions of progress toward the [secular/rational/ modern] "present" with the intrusions of fragments of the past.[2]

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[1] Notable exceptions exist, of course with the historical literature, though the emergence of the subfield of "political ecology" among geographers seems to go further to link environmental issues and questions of colonial/postcolonial power and domination. See Richard Peet and Michael Watts, *Liberation Ecologies: Environment, Development, Social Movements,* (London: Routledge, 1996).

[2] See William Roseberry, "Beyond the Agrarian Question in Latin America," in Fredrick Cooper, Allen F. Issacman, Florencia E. Mallon, William Roseberry, Steve J. Stern, eds., *Confronting Historical Paradigms: Peasants, Labor, and the Capitalist World Systems in Africa and Latin America,* (Madison: University of Wisconsin Press, 1993), 318-370; Michel Foucault, "Two Lectures," in Michel Foucault *Power/Knowledge: Selected Interviews and Other Writings, 1972-1977,* ed. Colin Gordan, trans. Colin Gordan, Leo Marshall, John Mepham, Kate Soper, (New York: Pantheon Books, 1980), 81. Dipesh Chakrabarty makes a similar point about how "subaltern histories" unsettle historical narratives defined by rationally defensible criteria enshrined in the practices of academic historians. See Dipesh Chakrabarty, *Provincializing Europe: Postcolonial Thought and Historical Difference,* (Princeton: Princeton University Press, 2000), 106-107.

Environmental historians in the U.S. academy have struggled to move beyond the geographical boundaries and historiographical traditions within the United States. Richard Grove attacks American environmental historians who demonstrated a "constrained and myopic" worldview. He argues that the introduction of environmental history "amounted … to a parochial takeover bid by North American scholars," who have demonstrated a clear sense of "Americo-centricity" since the 1970s.[3] Grove argues that American scholars have only recently become aware of the rest of the world as a result the rapid environmental degradation in peripheral, tropical regions. Perhaps responding to such critiques, practitioners of environmental history have tried to expand their field of inquiry. In 2005, the editors of the journal *Environmental History* marked their tenth anniversary by reflecting on the state of the field and speculating about future directions. Many of the contributors proposed including scholars from other parts of the world in their discussions and expanding the membership of the American Society of Environmental Historians (ASEH). Marcus Hall, for example, suggested that the "'A' in ASEH can be off-putting."[4] And, recently participants in a roundtable discussion published by the *American Historical Review* applauded the "expansion of environmental history to non-US areas."[5]

In a similar way, postcolonial scholars in the Latin American field have confronted the challenge of extending theoretical insights beyond their original boundaries, in this

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[3] Richard Grove, "Environmental History," in Peter Burke ed., *New Perspectives on Historical Writing,* (University Park, PA: Pennsylvania States University Press, 2001), 263-264.

[4] Marcus Hall "What's New for Environmental History?" *Environmental History,* 10:1 (January 2005).

[5] Lise Sedrez, "AHR Conversation: Environmental Historians and Environmental Crisis," *American Historical Review,* 113:5, (Dec. 2008), 1431-1465. Sedrez acknowledges, though, that scholars of Latin America were concerned the relationship between humans and nature long before such inquiries were named "environmental history."

case those by the normative Anglophone and Francophone literatures. New critiques from the perspective of Latin American and global history have prompted postcolonial scholars in the Anglophone tradition to re-evaluate the limits of the field.[6] Some scholars propose extending the temporal and geographic boundaries of postcolonial studies to look critically and comparatively at different colonial and postcolonial experiences, particularly those of Latin America.[7]

Arguing against critics who are skeptical that "Spanish America's and Spain's old clothes do not match very well with the latest postcolonial wardrobe," Mark Thurner and the contributors to *After Spanish Rule* have challenged a modular postcolonialism defined by the historical experiences of the decolonized nations of twentieth century Asia and Africa. Thurner follows Peter Hulme in asserting a place for Latin America in discussions of postcolonialism, though he cautions against uncritically expanding notions of the postcolonial to such an extent that postcolonial theory becomes the very

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6 See work on globalization by Fredrick Jameson, *Postmodernism, or, The Cultural Logic of Late Capitalism,* (Durham: Duke University Press, 1990); Arjun Appadurai, *Modernity at Large: Cultural Dimensions of Globalization,* (Minneapolis: University of Minnesota Press, 1996); Michael Hardt and Antonio Negri, Empire (Cambridge, MA: Harvard University Press, 2000). For a recent rethinking of postcolonial studies see Ania Loomba, Suvir Kaul, Matti Bunzl, Antoinette Burton, Jed Etsy, *Postcolonial Studies and Beyond* (Durham: Duke University Press, 2005).

7, Peter Hulme's struggle with Latin American postcolonialism unwittingly anticipates questions of agrarian development and environmental history when he asks, metaphorically, about whether scholars should "join the throng inside arguing about which crops to plant and where to put the gates." Peter Hulme, "Including America," in Ariel, 21:1 (Jan. 1995), 117; See also Bill Ashcroft, Gareth Griffiths, and Helen Tiffin, *The Empire Writes Back: Theory and Practice in Post-Colonial Literatures*, (London: Roudedge, 1989); Mark Thurner and Andres Guerrero, eds., *After Spanish Rule: Postcolonial Predicaments of the Americas (*Durham: Duke University Press, 2003); Walter D. Mignolo, *Local Histories/ Global Designs: Colonilaity, Subaltern Knowledges, and Border Thinking*, (Princeton: Princeton University Press, 2000), offers the concept of "border thinking" to open meaningful dialogue between indigenous forms of knowledge from different parts of the world and Anglophone academics to help correct some of the inequities fostered by colonialism and postcolonial regimes of knowledge and power. See also, Bill Ashcroft, "Latin America and Postcolonial Transformation," in *On Post-Colonial Futures: Transformations of Colonial Culture,* (London: Continuum, 2001), 21-35.

type of universalizing discourse that its proponents critique.[8] Thurner notes a deep "apprehension that globalizing the postcolonial so as to include Spanish American historicities would only contribute to a nauseating universalization or normalization of a postcolonial panopticon, thus closing the very critical slit that an edgy postcolonial heterodoxy from the fragments cut open in the first place." Many fear that postcolonial criticism could represent yet another discursive conquest of Latin America from the Anglophone centers of academic power.[9]

Thurner proposes a research agenda focused not only on "provincializing Europe," as Chakrabarty has proposed, but also on provincializing a modular postcolonial theory. For Thurner, a two-phase progression from an early modern colonialism in the Americas to a modern colonialism in Asia and Africa is limiting in two ways: it "tend[s] to disable connections between the colonial and the postcolonial," and it ignores "the problem of modernity after Spanish rule," when nationalist regimes attempted to incorporate subaltern populations into modernizing developmentalist projects. He also notes that the "devastating consequences of Creole nationalist "internal" settler colonialism … on native societies … were in many cases more pronounced than during the formal colonial period of Spanish imperial rule from

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8 See Peter Hulme, "Including America," in Ariel, 21:1 (Jan. 1995).

[9] Mark Thurner, "After Spanish Rule: Writing Another After," in *After Spanish Rule: Postcolonial Predicaments of the Americas,* ed. Mark Thurner and Andres Guerrero, (Durham: Duke University Press, 2003), 13-14. For a critique of the project to apply postcolonial studies to Latin America see J. Jorge Klor de Alva, "The Postcolonization of the (Latin) American Experience: A Reconsideration of 'Colonialism,' 'Postcolonialism,' and 'Mestizaje,'" in Gyan Prakash ed., *After Colonialism:Imperial Histories and Postcolonial Displacements,* (Princeton: Princeton University Press, 1995), 241-278 and Anne McClintock, "The Angel of Progress: Pitfalls of the Term 'Postcolonialism,'" in Francis Barker, Peter Hulme, Margaret Iverson, eds., *Colonial Discourse/ Postcolonial Theory,* (Manchester: Manchester University Press, 1994), 253-266.

abroad."[10] We are left wondering, "when does the postcolonial begin and end? … [M]ay the postcolonial … mark a condition [rather] than, or in addition to, epochal time?" By using the term "postcolonial" as the "name on the gate," Thurner evokes not merely a temporal shift, but the "double inscription" of postcolonialism as a critical positioning opposed to universalizing regimes of knowledge and power. For Thurner, "'postcolonial' is not a "substitute" epochal sign, but a problematizing supplement … [that] does the critical work of undermining the developmentalist teleology of the nation as the universal historical vessel of a transition … to the modern."[11]

Like Thurner, Florencia Mallon continues to wrestle with the applicability of shifting notions of subalternity and postcolonialism in Latin America. According to Mallon, such theories were attractive because they offered a critical alternative for radical scholars disillusioned with the decline of the left in the late 1980s and early 1990s.[12] As she continues to engage with the variants of postcolonial theory that emerged from debates within Subaltern Studies, Mallon notes that much of the attraction to postcolonialism lies in its ability to disturb "linear narratives by opening them to alternative periodizations and points of view." Postcolonialism presents critical scholars with the opportunity to engage in a "subversive fragmentation of history through the intrusion of the subaltern and the dominated."[13]

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[10] Thurner, "After Spanish Rule," 28-29.

[11] Thurner, "After Spanish Rule," 37-39.

[12] Florencia Mallon, "The Promises and Dilemmas of Subaltern Studies: Perspectives from Latin America," *The American Historical Review,* 99:5, (December 1994).

[13] Florencia Mallon, "Pathways to Postcolonial Nationhood: The Democratization of Difference in Contemporary Latin America," in *Postcolonial Studies and Beyond*, ed. Ania Loomba, Suvir Kaul, Matti Bunzl, Antoinette Burton, Jed Etsy, (Durham: Duke University Press, 2005), 273.

Like others, Mallon recognizes that Latin American nations had been independent for nearly two centuries before the contemporaneous emergence of both anti-colonial liberation movements and postcolonialism as a critical intellectual stance. In other words, "postcolonialism as a historical condition predates postcolonialism as a theoretical perspective." Yet, Mallon contends that, despite the inherent complications, postcolonial analyses can be productively applied to Latin America, and that Latin American case studies can serve to complicate and extend postcolonial theories.[14] Mallon argues that comparisons with the decolonization movements of the mid-twentieth century are particularly fruitful when we consider that "after World War II, when decolonization in Asia and Africa reached its peak, Latin America was hitting the culmination of its … national-popular period – that is, the time when activist and development-oriented states attempted a more recognizable national-democratic project, complete with broader social, economic, and political inclusion for oppressed groups." Put another way, during the mid-twentieth century many Latin American countries experienced conditions that closely resembled the "national liberation" movements of other parts of the postcolonial world. Though, in Latin America, "national liberation … tended to occur under the guidance of populist or interventionist states, often in the guise of government programs of industrialization."[15]

Furthermore, Mallon urges scholars to re-consider indigenous challenges to national-developmentalist projects that normally get folded into the amorphous category of "new social movements." Mallon argues, however, that postcolonial critiques and

[14] Mallon, "Pathways to Postcolonial Nationhood," 272-273.

[15] Mallon, "Pathways to Postcolonial Nationhood," 275.

sensibilities can be deployed in providing "a historical understanding of how … popular yearnings and visions were inscribed into, and often silenced by … experiments in national-popular inclusion," and national development. She explains that the "tensions between the failure of national-populists experiments and the ongoing desire for national-popular inclusion," allow postcolonial scholars "to go beyond the deconstruction of popular agency to envision potentially new forms of community and equality."[16]

This study follows Mallon and James Scott in examining the vicissitudes of state-led developmentalist projects in the postcolonial world. States throughout Asia and Africa followed Mexican examples as they poured tremendous resources into large-scale infrastructure and public works projects aimed at bringing the "new states" into national modernity by transforming the agrarian sector. Indeed, the postcolonial world is "littered with the debris of huge agricultural schemes."[17] Postcolonial governments tried to construct and create new economic and social conditions. In the process, however, they dramatically altered the physical environment and unleashed forms of political mobilization that rallied around a language of native environmental stewardship. Thus, the Papaloapan projects, which count among the earliest and largest development projects in the postcolonial world, offer an ideal opportunity to exploring the critical intersection of postcolonial studies and environmental history.

Considering the confluence of goals and research agendas, one might expect environmentalists and postcolonial scholars to be natural allies. Environmentalists and postcolonial scholars share an interest in the transnational forces that shape our

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[16] Mallon, "Pathways to Postcolonial Nationhood," 279.

[17] James Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed,* (New Haven: Yale University Press, 1998), 3.

contemporary world. They each focus on the displacement and destruction wrought by "modernism" and rationally-planned modernist development. They each celebrate the (more-or-less) marginalized historical actors who challenged the dominant forms of power and knowledge that have defined the natural world as simply a reservoir of capitalist commodities, though postcolonial scholars have also argued that the dominant ecological ideologies of wilderness preservation or rational scientific management also banish indigenous voices to the "wilderness." However, environmentalists and environmental historians often stand at odds with scholars from postcolonial traditions.

According to one literary critic, four main schisms divide postcolonial scholars and environmentalists. Postcolonialists tend to examine instances of discontinuity or hybridity, while environmentalists and environmental historians often focus on "discourses of purity" such as pristine wilderness, or ecological equilibrium. Postcolonial studies often deal with displacement, while environmentalism is rooted in specific natural spaces. Additionally, postcolonial critics of nationalism often run up against environmental discourses that emerged from nationalist concerns for preserving national identity and natural heritage. Finally, postcolonial scholars remain critical of the tendency among environmentalists to exclude or misrepresent marginal voices as they romanticize "timeless, solitary moments of communion with nature."[18] This study attempts to bridge the intellectual divide and asserts the usefulness of insights from postcolonial studies for a history of environmentalism in Latin America.[19]

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[18] Rob Nixon, "Environmentalism and Postcolonialism," in *Postcolonial Studies and Beyond*, ed. Ania Loomba, Suvir Kaul, Matti Bunzl, Antoinette Burton, Jed Etsy, (Durham: Duke University Press, 2005), 234-235.

[19] Nixon, "Environmentalism and Postcolonialism," 239. My understanding differs from Nixon, who proposes a "transnational ethics of place" for postcolonial ecocriticism.

Environmental historians have carved out the niche of their own unique subfield by drawing, thoughtfully if eclectically, on a variety of other academic disciplines. They have performed "a delicate interdisciplinary balancing act in trying to reconcile the insights of their colleagues in history, ecology, geography, anthropology," among others.[20] When environmental historians have been successful, they have eroded "the boundaries among traditional historical subfields, be they national or thematic, and [suggested] valuable new ways of building bridges," in part because of a literary style that translates the jargon and technical, self-referential languages of various academic disciplines into accessible narratives.[21] Of course, there is a danger in venturing into the maelstroms of other disciplines. Practitioners may "sail out into the waters of several disciplines before they have quite mastered one."[22] Beyond the issue of the potential limits imposed by the challenges of training in different academic vocabularies and debates, environmental historians must demonstrate that they have something unique and interesting to offer a variety of disciplines, that they are not merely handmaidens to historical ecologists or political historians. Environmental historians have had to develop their own sets of questions and methodologies.

According to Donald Worster, one of the pioneers of environmental history in the U.S. academy, environmental historians first emerged out of parallel intellectual and political movements of the 1960s and 1970s. Intellectually, environmental history was part of a revisionist trend aimed at making historical narratives more inclusive. Where

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[20] William Cronon, "Modes of Prophecy and Production: Placing Nature in History," *Journal of American History,* 76:4, (Mar. 1990), 1122.

[21] William Cronon, "The Uses of Environmental History," *Environmental History Review,* 17:3, (Fall 1993), 4-5.

[22] Cronon, "The Uses of Environmental History," 21.

other scholars were trying to include the hidden layers of race, class, and gender by writing history "from the bottom up," environmental historians dug deeper still, looking at the earth itself as an agent of historical change. Certainly, there were intellectual precursors. In the United States, historian of the U.S. West had been influenced by the frontier studies of Frederick Jackson Turner. For all of its problems, Turner's thinking on the frontier in American life recognized of the dynamic interplay between nature and culture. In addition, environmental historians have drawn inspiration from the French Annales School, particularly the work of Fernand Braudel. Braudel's analysis of the *long durée* depicted the environment "as an almost timeless element shaping human life over the long duration."[23] More recently, critics have argued that environmental historians are latecomers to questions about interactions between nature and culture that have long been the preoccupation of historical geographers like Carl Sauer.[24]

Environmental history also emerged alongside the environmental movement, the political and social movement that began to take its modern shape in the United States with the 1962 publication of Rachel Carson's *Silent Spring,* and flourished through the 1970s.[25] From the beginning, environmental history has been marked by a sense of moral purpose and political commitment. As it matured, however, the interests of

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[23] Donald Worster, "Appendix: Doing Environmental History," in Donald Worster, ed., *The Ends of The Earth: Perspectives on Modern Environmental History,* (Cambridge: Cambridge University Press 1988), 290.

[24] Richard Grove, "Environmental History," in Peter Burke, ed., *New Perspectives on Historical Writing,* (University Park, PA: Pennsylvania State University Press, 2001), 263-264.

[25] There were, of course, important earlier moments of environmental consciousness and activism in the United States before Carson's book appeared. One need only think of the nineteenth-century romantics, John Muir's eloquent defense of Hetch Hetchy, or Progressive concerns about public health standards in the home and the workplace. Yet, many still credit Carson with inaugurating the modern environmental movement as a political and social phenomenon. For a discussion of the early development of environmental history in the American academy, see Alfred W. Crosby, "The Past and Present of Environmental History," *The American Historical Review,* 100:4, (Oct. 1995), 1177-1189.

environmental historians diverged from those of environmental activists. Many environmentalists see in nature timeless universals that offer a counterpoint to modern, industrial society. They depict nature as a "stable, balanced, homeostatic, self-healing, purifying and benign," utopia juxtaposed against an alienating and corrupting modernity.[26] For many environmental historians, such utopian environmental fantasies are ahistorical and deeply troubling. By contrast, thoughtful scholars believe "that historical habits of thought … [offer] our best antidote to naïve assumptions, decontextualized arguments, excessive generalizations, and plain old-fashioned wishful thinking."[27] However sympathetic environmental historians may have been to the goals of their activist brethren, the academic subfield matured as "a scholarly enterprise that had neither any simple, nor any single moral or political agenda to promote." Instead, environmental historians devoted themselves to the "principal goal … [of] deepening our understanding of how humans have been affected by their natural environments through time and conversely how they have affected that environment."[28]

In the broadest terms, environmental historians have devoted themselves to three levels of analysis that illustrate the unique contribution that the subfield can contribute to the study of history. First, environmental historians have examined changes in the natural environments of the past. Second, they have examined "the political economies people erect within … natural systems."[29] Finally, environmental

[26] Cronon, "The Uses of Environmental History," 10-11.

[27] Cronon, "The Uses of Environmental History," 12.

[28] Worster, "Appendix: Doing Environmental History," 290-291.

[29] Cronon, "Modes of Prophecy and Production," 1123.

historians have scrutinized the perceptions, ideologies, and values that human cultures have imposed on or expressed through their relationship to the natural world.[30]

In examining the changes in natural environments of the past, historians have looked toward the natural sciences, particularly the field of ecology. Ecology examines the interactions among organisms and between them and their physical environments. As such, many practitioners emphasize their interest in "ecological history" or "historical ecology." Despite some of the advantages of thinking historically about scientific changes, the close link between environmental history and ecology presents problems and limitations. For example, historians must contend with competing versions of "scientific" definitions of such fundamental concepts as ecological equilibrium, and competing explanations of environmental change. The modern scientific discipline of ecology has its roots in the ideas of such thinkers as Fredrick Clements and Eugene Odum, each of whom postulated a sense of an ordered natural equilibrium that would remain relatively stable if freed from outside interferences and disruptions.[31]

More recent ecological understandings emphasize instability and dynamic, constant change.[32] Though, the differences in interpretation may actually result from differences in the scale of analysis. What looks like constant environmental change in the short term, may seem relatively stable from afar and over the long duration. And, indeed, environmental historians have wrestled with the appropriate scale for their

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[30] Worster, "Appendix: Doing Environmental History," in *The Ends of the Earth, Perspectives on Modern Environmental History,* (Cambridge: Cambridge University Press), 289-307.

[31] See Donald Worster, *Nature's Economy: A History of Ecological Ideas,* second edition, (Cambridge: Cambridge University Press, 1994); but also Eugene P. Odum, *Fundamentals of Ecology,* second edition, (Philadelphia: W.B. Saunders and Co., 1959).

[32] See, for example, Daniel Botkin, *Discordant Harmonies: A New Ecology for the Twenty-First Century,* (New York: Oxford University Press, 1990).

studies. Many, especially those who admire the work of Braudel and the French *Annalistas*, emphasize that, as a subfield, environmental history has made its greatest contributions by looking at the development of human societies in ecological, if not geological time. In such cases, changes in the relationship between human cultures and the natural world could really only be dramatically altered under truly remarkable circumstances.[33] At its worst, looking at changes in the relationship between human culture and the natural world from such a perspective can lead to essentializing complex human history and culture, while offering a crude environmental determinism as the major explanatory factor in historical change.[34]

This study asserts that there is a real value in examining environmental change over the short or intermediate term. As scholars studying the impact of natural disasters have demonstrated, acute moments of environmental change "offer an opportunity to examine larger social circumstances of … [a] society in times of stress, the points at which the routines of daily life were interrupted and suspended."[35] In times of ecological stress, the ordinary routines of daily life become visible to the historian. Such moments are often obscured from the historical record because their very "ordinariness" prevents meaningful comment and reflection. Furthermore, moments of dramatic environmental

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[33] See Alfred Crosby, *The Columbian Exchange: The Biological and Cultural Consequences of 1492,* 30th Anniversary Edition, (New York: Praeger, 2003).

[34] The Pulitzer Prize winning book, Jared Diamond, *Guns, Germs, and Steel: The Fate of Human Societies,*(New York: W. B. Norton and Company, 1999) exemplifies this trend. Though admired by many environmental historians, Diamond offers a narrative of inevitable cultural development in Eurasia as the result of such environmental privileges as East-West migration patterns and access to large domesticable animals. Diamond's argument, however, ignores human agency and historical contingency as much as his own assumptions express a Eurocentric emphasis on the accumulation of material goods as the ultimate expression of culture.

[35] Louis A. Perez, Jr., *Winds of Change: Hurricanes and The Transformation of Nineteenth-Century Cuba,* (Chapel Hill: University of North Carolina Press, 2001), 12.

change alter the relationship between nature and culture, and between unequal members with society, so completely that new relationships can emerge out of the scarred and flooded landscapes of the past. Of course, by the nineteenth and twentieth centuries, human technology had progressed to the point where human initiatives, however well-intentioned, could provoke disastrous consequences that often rivaled the most dramatic and destructive natural disasters. Humans literally moved mountains and changed the course of rivers, flooding upland valleys to quench the thirst of lowland farmers. Like studies of natural disasters, the present study seeks to understand the impact of environmental change in the short and intermediate term in order to include environmental change (in this case man-made environmental change) "as one more variable in the formation of nation."[36] Large scale studies over the long term might suggest an ordered ecological equilibrium that could only be disrupted by extraordinary human interventions, such as the encounter between the Europe and the Americas in the fifteenth-century. Without denying some of the benefits of such studies of the *longue durée*, smaller scale analysis offers the advantage of exploring the contingency of human history, and illuminates those flashpoints when it became possible to re-imagine new ways for human cultures to live in nature.

The second, and perhaps the most prevalent, level of analysis that has intrigued environmental historians involves not simply changes in the land, but the complex interaction between natural forces and human political economies or modes of production. Environmental historians looking at the evolving and interactive relationship

[36] Perez, *Winds of Change,* 10.

between nature and culture have often drawn on the work of materialist cultural anthropologists, especially that of Julian Steward and Marvin Harris.

In his seminal work, *Theory of Cultural Change: The Methodology of Multilinear Evolution,* Steward posits a theory of cultural ecology to explain the relationship between economic production and the physical environment. He asks pointed questions about which resources people exploited, what technologies they employed, and finally, about how people organized themselves in order to undertake such forms of production or environmental exploitation. Steward proposes cultural ecology as a new way of thinking and a new research method.[37] Marvin Harris draws on such notions to develop a "scientific," or positivist theory of "Cultural Materialism." Harris rejects Steward's cultural ecology because Steward's cultural core is analogous to Marx's "base" and fails to account for secondary cultural features that are "determined by purely chance cultural-historical factors."[38] Harris is primarily interested in promoting a scientific theory of historical change, and a scientific way of explaining variations and divergent evolutionary paths among different cultures. In his later work, he develops his ideas into a theory of cultural materialism. According to Harris, the relationship of a

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[37] Julian Steward, "The Concept and Method of Cultural Ecology," in *Anthropology in Theory: Issues in Epistemology,* ed. Henrietta Moore and Todd Sanders, (Malden, MA: Blackwell Publishing, 2006), 103-106.

[38] Marvin Harris, *The Rise of Anthropological Theory: A History of Theories of Culture,* updated edition, (Walnut Creek, CA: AltaMira Press, 2001), 655; Harris, *The Rise of Anthropological Theory,* 660-661; Steward himself discusses the cultural core as "the constellation of features which are most closely related to subsistence activities and economic arrangements. The core includes such social, political, and religious patterns as are empirically determined to be closely connected with these arrangements. Innumerable other features may have great potential variability because they are less strongly tied to the core. These latter, or secondary features, are determined to a greater extent by purely cultural-historical factors – by random innovations or by diffusion – and they give the appearance of outward distinctiveness to cultures with similar cores. Cultural ecology pays primary attention to those features which empirical analysis shows to be most closely involved in the utilization of the environment in culturally prescribed ways." Julian Steward, *Theory of Cultural Change,* (Urbana: University of Illinois Press, 1955), 37.

society to nature was defined by the specific infrastructure, or "techno-environment" of a given culture.

There are a number of serious problems with Harris's assumptions and "scientific" theories, but they continue to influence environmental historians. Indeed, many environmental historians have addressed precisely such questions of shifting from one techno-environment, or one "mode of production," to another. In particular, Latin Americanists, have focused on two major shifts in the dominant mode of production. First, they have examined the consequences of the shift away from the variety of Indian agricultural practices as European countries conquered and exploited the Americas in a unique capitalist/colonial mode of production. For environmental historians, a shift to capitalism involved redefining the natural world of the Americas as the reservoir for certain natural phenomena that could be valuable or profitable as commodities, rather than simply an anthropocentric system in which one human group extracts surplus value from another.[39] Second, environmental historians of Latin America have studied the ways in which the intensification of production of commodities accompanied the shift from colonial to national regimes of knowledge and power. Such shifts involved the search for new knowledges and new technologies that altered the natural world in novel ways and shaped the course of Latin American nation-making.[40]

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[39] Indeed environmental histories can provide a powerful critique of Marx's notion of production in the sense that an ecological perspective demonstrates that relations of production should more properly be understood as relationships of consumption, "since all human labor consumes ecosystemic energy flows in the process of performing physiological and mechanical work." Thus, nature, and not merely human labor create the use value of commodities. See William Cronon, "Modes of Prophecy and Production: Placing Nature in History," *The Journal of American History,* 76:4, (Mar., 1990), 1124-1125.

[40] In many ways, defining and labeling the different modes of production is rather arbitrary. One of the problems that critics have articulated concerning such "modes of production" analysis involves the fact that there is no consensus on exactly how many various modes of production exist, or on which criteria should be used to define each of them. In other words, no one has attempted a "finite taxonomy of modes." See Cronon, "Modes of Prophecy and Production," 1125.

Pioneering scholars such as Eleanor Melville and Warren Dean have explored the transition from a "traditional" mode of production to a European/colonial/capitalist mode focused on producing livestock and commodities most desirable to European tastes.[41] Some have argued that Europeans created (not discovered) a "New World" by altering the natural environments of the Americas in novel ways.[42] Other scholars, especially Dean, see the intensification of production of marketable commodities as a major factor leading to the profound environmental degradation of the tropical forests.

While avoiding the pitfalls associated with dependency theory or modernization theory, environmental historians of Latin America acknowledge that the region has played a specific role in the capitalist global economy that has emerged, in large part, as a result of the new modes of production initiated by European colonization of the Americas.[43] Certainly, since the eighteenth and nineteenth-centuries, many Latin American countries have been engaged in producing mineral and agricultural "commodities." Stuart McCook places the production of commodities for capitalist markets at the center of his study of the emerging nations of the Caribbean. He attempts to chart the link between nation-building elites and botanical scientists, focusing particularly on the export booms of the nineteenth and early twentieth

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[41] Eleanor Melville, *Plague of Sheep: Environmental Consequences of the Conquest of Mexico,* (Cambridge: Cambridge University Press, 1997); Warren Dean, *With Broadax and Firebrand: The Destruction of the Brazilian Atlantic Forest,* (Berkeley: University of California Press, 1995); For North American examples see William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England,* 20th Anniversary ed., (New York: Hill and Wang, 2003). .

[42] Shawn William Miller, *An Environmental History of Latin America,* (Cambridge: Cambridge University Press, 2007).

[43] John Soluri, for example, claims that both modernization theory and dependency theory focus too much attention on American fruit companies as agents of historical change in northern Honduras. Soluri instead focuses on the agency of non-company banana growers, nature (in the form of plant pathogens), and the influence of American consumers. See John Soluri, *Banana Cultures: Agriculture, Consumption, and Environmental Change in Honduras and the United States,* (Austin; University of Texas Press, 2005),

centuries. McCook argues that planter elites sought to increase yields (intensification, rather than the extensification of simply expanding territory under production). Due to ideological sympathies of the post-Enlightenment period, they turned to technology and science to offer solutions to control the natural areas of the national territories. McCook argues that the export boom was marked by the emergence of a transnational "Creole Science" in which Latin American scientists modeled their research on foreign (particularly American) research institutes but adapted practices to unique tropical conditions.[44]

In his compelling book on banana cultivation in Honduras, John Soluri employs concepts from "agroecology" to explain the development of society in the banana zones of Central America. Agroecology is an emerging field that examines the interactions between agricultural systems and their surrounding environments. According to Soluri, "agroecosystems are places created and transformed by the fluid processes that … possess both dynamic pasts and uncertain futures rooted in an ecosocial realm of possibilities."[45] Though subtle and successful in many ways, at its core, Soluri's study simply offers a refinement on thinking about the relationship between human society and the specific mode of production defined by agricultural commodity production.

Christian Brannstrom and Stephania Gallini have gone as far as declaring that the intersection of territories, commodities, and knowledges represents a promising trend for charting a distinct course for Latin American environmental history. They ask:

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[44] Stuart McCook, *States of Nature: Science, Agriculture, and Environment in the Spanish Caribbean, 1700-1940*, (Austin: University of Texas Press, 2002).

45 John Soluri, *Banana Cultures*, 5.

1. To what extent was environmental change at the center of territorial conflicts between nation-states and indigenous peoples or local communities?

2. What were the environmental implications of the commodities produced in and exported from Latin America?

3. How did new knowledge encourage territorial expansion and production of new commodities?[46]

However, their supposition that a focus on a mode of production characterized by commodity production can represent a unique and singular contribution from Latin American environmental history is challenged by the fact the historians from other traditions have presented remarkably similar analytical models.

In another context, historians of South Asia have proposed a research agenda centered on a modified understanding of shifting modes of production. Though they account for the changing "hardware," the technology and systems of property that govern natural resource use, and "software," the beliefs and values which "legitimize and validate human interactions with nature," Madhav Gadgil and Ramachandra Guha focus primarily on writing environmental history in terms of shifting modes of production.[47] Gadgil and Guha present a challenge and critique to the Marxist genealogy of the traditional understandings of "mode of production" by claiming that Marxist interpretations are "not adequately materialistic." As other environmental historians have argued, Gadgil and Guha claim that earlier conceptions ignore the "ecological infrastructure of human society." Instead, they propose the designation,

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[46] Christian Brannstrom, Stephania Gallini. "An Introduction to Latin American Environmental History." In *Territories, Commodities, and Knowledges: Latin American Environmental History in the Nineteenth and Twentieth Centuries*, ed. Christian Brannstrom, (London: Institute for the Study of the Americas, 2004), 2.

[47] Madhav Gadgil and Ramachandra Guha, *This Fissured Land: An Ecological History of India,* (Oxford: University of Oxford Press, 1992), 4.

"modes of resource use" to account for "soil, water, animal, mineral, and vegetative bases of society."[48] As such, they examine historical change in terms of conflict between different modes of resource use, and conflict within a given mode.[49]

The focus on modes of production, especially on the capitalist mode of production, has produced significant insights. Environmental historians have argued that the shift from traditional systems to capitalism over the past five hundred years has led to the commodification of land, ecological simplification, monocultures vulnerable to pests and disease, and an unequal division of labor. Yet, not all environmental historians agree on a research agenda focused on studying the production of commodities, or indeed on a program that places modes of production at the center of the relationship between nature and culture. While many historians have written about the intersection of economy and ecology, few have successfully integrated all three of the levels that distinguish the field of environmental history. Too often, historians have neglected the ways in which "'the gathering strength of the human imagination over nature" has influenced both the shifts in historically specific modes of production and the complex interdependence of human societies and the natural world. Put another way, some environmental historians have expressed reservations about a research agenda characterized by "potentially excessive materialism."[50]

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[48] Gadgil and Guha, *This Fissured Land,* 4-13.

[49] Geographers concerned with "political ecology" have recently moved beyond these Marxist or quasi-Marxist foundations to reformulate understandings of conflicts over natural resources in terms of poststructural theories that emphasize "the possibility of a more robust political ecology which integrates politics more centrally, draws upon aspects of discourse theory which demand that the politics of meaning and the construction of knowledge be taken seriously, and engages with the wide-ranging critique of development and modernity." See Peet and Watts, *Liberation Ecologies*, 3.

[50] Donald Worster, quoted in William Cronon, "Modes of Prophecy and Production: Placing Nature in History," *The Journal of American History,* 76:4, (Mar., 1990) 1123-1124.

William Cronon, for example, argues that the focus on modes of production is limited in three main ways. First, with little effort to reach an agreement on what, exactly, defines a mode of production, the variety of "types" of modes threatens to multiply to such a degree that the term loses all analytical specificity. Second, such analysis leads to a sense of "holism" that obscures complexity and contradictions within various modes. Finally, the overwhelming emphasis on shifts to an ill-defined "capitalist" mode of production dooms environmental historians to the repetitive task of retelling the same story – "of soils eroded, habitats destroyed, food crops simplified, communities dismantled, ecosystems destabilized."[51] Instead of focusing simply on modes of production, Cronon suggests that environmental historians extend pioneering work by focusing on relationships, on "'who has gained and who has lost power as … modes of production have changed."' Such a task inevitably involves exploring the broader cultural systems in which various modes of production are embedded.[52]

This third level of analysis for environmental history, then, proves to be the most useful for reconciling environmental history and postcolonial criticism. Many scholars believe that environmental historians have done their best work "studying the perceptions and values people have held about the non-human world."[53] Such historians often follow literary critic Raymond Williams in noting that the very term "nature" is a remarkably complex human construction. According to Williams, "'the idea of nature contains, though often unnoticed, an extraordinary amount of human

[51] Cronon, "Modes of Prophecy and Production," 1123-1131.

[52] Worster, quoted in Cronon, "Modes of Prophecy and Production," 1130-1131.

[53] Worster, "Appendix: Doing Environmental History," 302.

history.'"[54] The term carries a multitude of overlapping, and often contradictory, meanings that are the product of historical processes. Environmental historians have scrutinized the ways in which different people have understood "nature" over time. In addition, environmental historians have tried to "confront the formidable challenge of examining ideas as ecological [and historical] agents."[55]

Such analysis provides a basis for linking environmental history with the investigations of the relationship between the construction of knowledge and the exercise of power that have come to characterize postcolonial studies. In particular, I argue that ideas about Latin American environments are important in three distinct, but related ways. First, following scholars who have examined the ways in which depictions of "the tropics" justified colonial domination, I argue that the discourse of tropicality continued to influence Mexican government planners trying to incorporate the Papaloapan River Basin into a broader program of nationalist development. Second, ideas about the proper use of natural resources linked the state's development project with scientific notions of agronomy that marginalized local knowledge and indigenous land use practices. Finally, linking postcolonial studies and environmental history is useful in analyzing the emergence of environmental movements that challenged the state development projects during the 1970s and 1980s. Whereas other studies of conservation and environmentalism in Mexico see this "new social movement" as the product of middle class *chilango* concern over air pollution in Mexico City, focusing on marginalized or subjugated voices reveals a discourse of nativist environmentalism

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[54] Raymond Williams, "Ideas of Nature," in *Culture and Materialism: Selected Essays,* (London: Verso, 1980), 67.

[55] Worster, "Appendix: Doing Environmental History," 304.

linked to indigenous rights movements that champion both local knowledge and new priorities of environmental sustainability.

Visions of the Tropics

Many scholars of Latin America have devoted particular attention to the ways in which "the tropics" have been imagined and deployed to explain (and justify), Western colonial projects. According to Felix Driver and Lucianna Martins:

> The contrast between the temperate and the tropical is one of the most enduring themes in the history of global imaginings. Whether represented positively (as in fantasies of the tropical sublime) or negatively (as a pathological space of degeneration), tropicality has frequently served as a foil to temperate nature, to all that is modest, civilized, cultivated.[56]

Depictions of tropical environmental abundance often accompany descriptions of tropical peoples living in a "state of nature," lacking the refinements and religiosity of European civilization. In addition to justifying colonialism, images of the tropics as an earthly paradise led Europeans to project utopian fantasies onto American tropical environments. Richard Grove has studied "the metaphors and images used by Europeans to characterize, identify, and organize their perceptions of nature at the expanding colonial periphery." He concludes that two discursive tropes permeate popular imaginings of tropical American nature. Grove describes the powerful images of "the garden" as an Arcadian ideal, and "the island", which represented the biblical edenic utopia. He claims that "[b]oth [images] offered the possibility of redemption, a realm in which Paradise might be recreated or realized on earth, thereby implying a

[56] Felix Driver, Lucianna Martins, Tropical Visions in an Age of Empire, (Chicago: University of Chicago Press, 2005) 3.

structure for a moral world in which interactions between people and nature could be morally defined and circumscribed."[57]

In addition to representing a place of earthly paradise, the tropics could also be wild and dangerous, a "green hell." The tropics were "a place of radical otherness to the temperate world … where the superabundance of nature" threatened "to overwhelm human endeavor and reduce the place [back] to nature itself."[58] Tropical nature could stand for many contradictory images -"for heat and warmth but also for a dangerous and diseased environment; for superabundant fertility but also for fatal excess; for species novelty but also for the bizarre and deadly; for lazy sensuality and sexuality but also for impermissible racial mixing and degeneration."[59] In these narratives, people living in tropical climates become mere caricatures. They are depicted as brutal savages or noble savages, or in more recent struggles over environmental preservation, indigenous peoples of tropical environments are silenced by discourses that treat them much like an endangered species whose habitat must be protected.[60] In either case, tropical nature and tropical peoples become objects to be acted upon by outsiders. According to Richard Grove, "Tropicality" is a "'system of representation'… a way of seeing, thinking about, and representing [places and peoples], characterizing [them] in terms of certain

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[57] Richard Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1800*, (Cambridge: Cambridge University Press, 1995) 13. Though the term, "tropicalism" may be more appropriate since Tropicality would be like postcoloniality, that is, the predicament of being tropical or postcolonial. Tropicalism would refer to the discourse that essentializes that condition or predicament.

[58] Nancy Leys Stepan, *Picturing Tropical Nature,* (Ithaca, NY: Cornell University Press, 2001), 18.

[59] Stepan, *Picturing Tropical Nature,* 21.

[60] Candace Slater, "Amazonia as Edenic Narrative," in William Cronon, ed., *Uncommon Ground: Toward Reinventing Nature,* (New York: W.W. Norton and Company, Inc., 1995), 119-121.

stereotypical features, defining [them] in ways which simultaneously express both difference from the West and inferiority to it." [61]

Jorge Cañizares-Esguerra goes further and offers a sophisticated reading of how European ideas of nature have inspired efforts to remake the natural world since the sixteenth century. Arguing against North American exceptionalism, Cañizares-Esguerra focuses on commonalities between Northern European and Iberian colonialism, and he asserts that Iberian ideas of nature motivated both Spanish and Puritan conceptions of the Americas. He argues that Europeans viewed America as a domain in which the devil had dominated man and nature for centuries. Colonization, then, became a Manichean contest against the forces of evil, and attempts to assert control of the natural world took on a spiritual urgency. Cañizares-Esguerra argues that agricultural plantations were more than just economic enterprises, they were a form of "'spiritual gardening' [that] became part of a larger epic of attrition against the devil."[62] Cañizares-Esguerra's assertions point to the usefulness of a postcolonial perspective that is sensitive to the ways in which the fragments of the colonial past invade a modernity marked by "faith" in science as a secular religion. Twentieth-century Mexican policy makers continued to understand an agricultural transformation as the necessary antidote to the forces of darkness and superstition.

Cañizares-Esguerra also argues for the colonial Iberian roots of modern science and a link between the emergence of scientific orthodoxies and commercial development. He argues that Creole scientists inspired the work of the famed German

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[61] David Arnold, *The Problem of Nature: Environment, Culture, and European Expansion,* (Cambridge, MA: Blackwell Publishing, 1996), 141-142.

[62] Jorge Cañizares-Esguerra, *Puritan Conquistadors: Iberianizing the Atlantic, 1550-1700,* (Stanford: Stanford University Press, 2006), 186.

naturalist Alexander von Humboldt. Cañizares-Esguerra claims the Humboldt "learned to read . . . [the American landscape] as a natural laboratory for the study of geography of plant communities in part because local Spanish American scholars had for decades (if not centuries) been developing the idea."[63] Cañizares-Esguerra also claims that eighteenth-century scholars in the Americas moved beyond a study of nature meant to "exalt God's providential designs," to a modern colonial science that "sought to tap the agricultural potential," of colonies "endowed by Providence . . . [to] become a leading commercial emporium in the world."[64] Humboldt's writings were a crucial part of that process.

In her seminal study of travel writers, Mary Louise Pratt argues that, however derivative Humboldt's ideas may have been, his writings influenced generations of European natural scientists.[65] According to Pratt, Humboldt "reinvented South America first and foremost as nature."[66] In the massive corpus of Humboldt's writings, indigenous peoples appear only as the dead inhabitants of ancient ruins, or as servants that "point out exploitable resources," to Humboldt and his companions. South American nature overwhelms Humboldt's narrative. According to Pratt, Humboldt depicted the American tropics as a "primal world of nature, an unclaimed and timeless

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[63] Jorge Cañizares-Esguerra, *Nature, Empire, and Nation: Explorations, of the History of Science in the Iberian World,* (Stanford: Stanford University Press, 2006), 116; For a discussion of the influence of Humboldt and nineteenth century depictions of the American tropics, see Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation,* (London: Routledge, 1992); Jorge Cañizares-Esguerra, *How to Write the History of the New World: Histories, Epistemologies, and Identities in the Eighteenth-Century World* (Stanford: Stanford University Press, 2001).

[64] Jorge Cañizares-Esguerra, *Nature, Empire, and Nation: Explorations of the History of Science in the Iberian World,* (Stanford: Stanford University Press, 2006), 62-63.

[65] Pratt does not disagree with Cañizares-Esguerra on the influence of American thinkers, though she places less emphasis on the origins of his though than his influence. See Pratt, *Imperial Eyes,* 124-130.

[66] Pratt, *Imperial Eyes,* 120.

space occupied by plants and creatures (some of them human) but not organized by societies and economies; a world whose only history was the one about to begin."[67]

Humboldt's work proved crucial to a re-conceptualizing nature as a reservoir of commercial resources that both European colonial powers and the leaders of nearly independent nations hoped to exploit. According to Cañizares-Esguerra, as Humboldt derived many of his ideas from Iberio-American colonial thinkers, he reinterpreted and gave new value to indigenous sources and earlier Spanish chronicles. He stood apart from, but influenced, contemporary debates in which Creole thinkers and exiled Jesuits challenged Eurocentric claims about the degenerative qualities of American tropical environments.[68] As Creoles anticipated and influenced Humboldt, they developed their own theories about Latin American nature, they altered Eurocentric scientific assumptions, and they articulated what Cañizares-Esguerra calls "patriotic epistomolgies." Such thinkers as Francisco Javier Clavijero and Juan de Velasco wrote histories of the Aztec and Inca empires that challenged the perceptions of enlightened travel writers and validated the oral history of Amerindians and the early accounts of Spanish friars as credible sources of historical information.

For Cañizares-Esguerra, investigating such Creole sources is useful for critiquing a Eurocentric historiography that has made "a universal master narrative out of local, provincial European experience."[69] For the purposes of this study, however, Cañizares-

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[67] Pratt, *Imperial Eyes,* 126.

[68] For the classic study of debates between Creole and European thinkers, See Antonello Gerbi, *The Dispute of the New World: The History of a Polemic, 1750-1900,* Rev. Ed., trans. Jeremy Moyle, (Pittsburgh: University of Pittsburgh Press, 1955); Cañizares-Esguerra is sympathetic to Gerbi's treatment, but he critiques Gerbi's assertion that Latin American thinkers was "worthless." See Jorge Cañizares-Esguerra, *How to Write the History of the New World*, 347-348.

[69] Cañizares-Esguerra, *How to Write the History of the New World,* 210.

Esguerra's body of work serves to blur the distinction between colonial and postcolonial, European and American. Images of the natural world in the American tropics inspired colonial attempts to bring order and claim the New World as part of an epic struggle against the devil. With epistemological shifts in the eighteenth and nineteenth centuries, Creoles patriots and the leaders of new nations (who were not necessarily the same people) re-imagined an awe-inspiring, empty tropical nature that needed to be brought under control to realize the full commercial potential of the nation. Linking science, agricultural development, and the nation unsettles simple chronological distinctions between the "colonial" and the "postcolonial."

In twentieth-century Mexico, the developmentalist state justified encroachments into the lowlands of the Papaloapan Basin by evoking images of a tropical world outside of time, outside of modernity. According to Thomas Poleman, an American economist who worked closely with the Papaloapan Commission, the "humid tropical regions … are regarded as containing the country's greatest reserve of potentially arable land," and yet, "[b]ecause of isolation, disease, and an unpleasant climatic environment, they have historically supported only a small population and a spotty . . . type of agriculture."[70] Poleman evokes a vision of the tropics that is at once abundant and threatening, and in need of massive state intervention. For him, the Mexican tropics "will always have a mystical appeal."[71] Later, critics of the state's developmentalist projects would express their own vision of tropical nature in need of outside assistance. Anthropologists, travelers, and activists in the 1960s and 1970s valorized an indigenous

[70] Thomas Poleman, *The Papaloapan Project: Agricultural Development in the Mexican Tropics,* (Stanford: Stanford University Press, 1964), 3.

[71] Peter T. Ewell and Thomas T Poleman, *Uxpanapa: Agricultural Development in the Mexican Tropics,* (New York: Pergamon Press, 1980), x.

culture existing close to nature that was threatened by increased development. With the discursive shifts represented by these new images, indigenous groups in southern Mexico expanded the political sphere to make claims on the state using a language of nativist environmentalism. Such claims were supported by the legitimacy of new scientific discourses that drew upon ancient indigenous land use practices to challenge the dominant scientific paradigm of resource management that had driven the agendas of government planners.

History of Science and the State

The history of science has become an important component for environmental historians trying to understand the role of ideas about nature in shaping human history. Scientists do not exist in isolation from the societies in which they exist. Scientists and their forms of knowledge reflect, reproduce, and reshape cultural values and relationships of power. Such thinking is not new, of course. It resonates with earlier theoretical scholarship which situates the production of knowledge within local and colonial constellations of power. Despite claims that, "it is not mere ethnocentric puffery to assert that science is a way of knowing that has a uniquely transcendent value for all human beings," historians of science have recently become more critical of scientific claims to objective truth.[72]

Though he was not the first to do so, Thomas Kuhn offered an influential challenge to positivist notions of scientific progress by arguing that science changed over time as a result of revolutionary paradigm shifts, rather than as a result of the teleological accumulation of observable scientific facts and increasingly accurate

[72] Harris, *Cultural Materialism*, 27.

explanatory theories. For Kuhn, "science-as-cumulation is entangled with a dominant [Baconian] epistemology that takes knowledge to be a construction placed directly upon raw sense data."[73] Instead, Kuhn argues that normal scientific practices propose and solve puzzles limited by the parameters of specific *interpretive* paradigms. As anomalies emerge to demonstrate the ineffectuality of a given paradigm, a crisis emerges among scientists, a crisis which can only be resolved by the rejection of older paradigms in favor of newer explanatory models. For Kuhn, such shifts do not represent the accumulation of scientific progress. Instead, they are something akin to political revolutions in which advocates of competing paradigms square off to win the hearts and minds of the scientific community. "As in political revolutions, so in paradigm choice – there is no higher standard than the assent of the relevant community."[74]

Scientific knowledge, experimental designs, and claims to truth are functions of scientific discourse - and they are ultimately political. In their study, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life,* Steven Shapin and Simon Schaffer critique the processes by which scientific orthodoxies have been constructed and enforced. They argue that "the problem of generating and protecting knowledge is a problem of politics."[75] In a similar vein, Jan Golinski's survey of recent histories of science challenges teleological notions of scientific progress and seeks an "uncoupling of historical and sociological inquiry from issues of truth, or realism or objectivity." Instead Golinski proposes what he calls a "constructivist outlook . . . which regards

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[73] Thomas Kuhn, *The Structure of Scientific Revolutions,* 2nd ed., (Chicago: University of Chicago Press, 1970), 96.

[74] Kuhn, *The Structure of Scientific Revolution,* 94.

[75] Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life,* (Princeton: Princeton University Press, 1985).

scientific knowledge primarily as a human product, made with locally situated cultural and material resources."[76] In addition to challenging the ways in which scientific "truths" are constructed in political arenas, historians also explore the ways in which "claims" to objective truth are mobilized in the political sphere.

According to Michel Foucault, critical historians of science are generally not "opposed primarily . . . to the contents, methods, or concepts of science." Rather, they challenge "the effects of the centralizing powers which are linked to the institution and functioning of an organized scientific discourse." Foucault and others challenge the effect of power that scientific discourses create as they lay claim to objective truth by reifying certain knowledges as "science" and subjugating others as "local, discontinuous, disqualified, [or] illegitimate knowledges."[77] The power of scientific discourse to legitimize certain forms of knowledge, and marginalize others, becomes particularly insidious when claims to scientific expertise buttress colonial and postcolonial projects of state domination.

Constructing and maintaining state power involves ordering social and historical facts to facilitate governance and administration.[78] Just as a discourse of "the tropics" opened humid, fecund regions to state development projects, scientific discourse on the need to manage natural resources supported specific kinds of development projects and marginalized local knowledge and local environmental management practices. According to James Scott, large scale government projects often fail because they

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[76] Jan Golinski, *Making Natural Knowledge: Constructivism and the History of Science,* (Chicago: University of Chicago Press, 1998), xvii-xviii.

[77] Michel Foucault, "Two Lectures," 83-84.

[78] See Bernard Cohn, *Colonialism and it Forms of Knowledge: The British in India,* in *The Bernard Cohn Omnibus,* (Oxford: Oxford University Press, 2004).

arrogantly neglect local knowledges.[79] In Scott's study of state high modernist development, he argues that "legibility [is] the central problem in statecraft." In order for a state to govern it must reduce social complexity and the dynamics of the natural world to terms and concepts that were legible to state policy makers. As Scott claims, "agriculture is, after all, a radical reorganization and simplification of flora to suit man's goals." Scientific management of agriculture is "calculated to make the terrain, its products and its workforce more legible – and hence more manipulable – from above and from the center."[80]

In Mexico, the state's efforts to develop the Papaloapan Basin involved transforming the land from a wild tropical jungle to productive agricultural land, and transforming backwards Indians into productive, modern workers/citizens. Though the projects officially centered on the construction of dams and other works for hydroelectricity and irrigation, the Papaloapan Commission employed a small army of researchers to map the basin, to catalogue the flora and fauna of the region, and to compile comprehensive ethnographies of the indigenous peoples that were displaced, and thus "freed" to abandon their traditional way of life and participate in the modernist nation-building project. Moreover, the state's agricultural development program was managed by scientific experts trained in new techniques developed by the Mexican government's collaboration with the Rockefeller Foundation. During the 1940s and early 1950s, researchers from the Rockefeller Foundation produced hybrid seeds that were resistant to plant pathogens and could increase yields of corn and wheat. But, the

[79] Scott, *Seeing Like a State*.

[80] Scott, *Seeing Like a State,* 2-3.

hybrid seeds required tremendous amounts of chemical fertilizers, pesticides, and irrigation, all of which required capital and a created a new dependence on access to credit from the government. By linking the government development project to the expertise of agricultural scientists, the Papaloapan projects colonized the tropical lowlands, but depleted the soils and made the people of the basin more dependent on the state. By the 1970s, as the failures of such schemes became more evident, local indigenous groups mobilized to protest further government public works schemes as they championed indigenous environmental practices as an alternative model of agricultural development.

Environmentalism of the Poor and Nativist Environmentalism

Focus on the middle-class efforts to curb air pollution in Mexico City has largely obscured other environmental movements in Mexico, particularly the nativist environmentalism the emerged in the wake of the Papaloapan projects.[81] Yet, listening to the political marginalized voices offers a third opportunity for fruitful engagement between postcolonial studies and environmental history. Postcolonial scholars have been particularly influential in the study of environmental politics and conflicts over natural resource use. Many scholars have drawn attention to the ways in which dominant discourses, whether colonial, nationalist-developmentalist, or mainstream environmentalist, have worked to silence subaltern voices. In some cases, the work of postcolonial environmental thinkers and activists has been rendered invisible by the dominance of U.S. environmentalists. As Rob Nixon argues, for example, environmentalists such as the prominent Nigerian Ken Saro-Wiwa, who was murdered

[81] See Lane Simonian, *Defending the Land of the Jaguar: A History of Conservation in Mexico,* (Austin: University of Texas Press, 1995).

for his efforts, have been largely ignored because they remain outside the American pantheon of environmental thinkers.[82] And, as Joan Martinez-Alier argued in the early 1990s, environmentalism of the poor remains a neglected area of research.[83]

There continues to be an imbalance in scholarly production regarding the emergence of environmentalism in the United States compared to environmental politics in much of the postcolonial world. For the United States, environmental historians have written sophisticated studies of the multiple environmental experiences and priorities caused by differences of race, class, and gender.[84] Though instructive, the works of historians of the United States remain limited for studying the emergence of environmentalism in the postcolonial world. Environmental historians have largely limited themselves to studies of the United States.[85] At best, a mutual indifference defines the relationship between environmental historians in the American academy and scholars of the postcolonial world, though real theoretical and disciplinary boundaries often create real animosity between different academic traditions. Postcolonial scholars have viewed various strains of environmentalism as elitist or imperialist discourses that

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[82]Nixon, "Environmentalism and Postcolonialism."

[83] Joan Martinez-Alier, "Ecology and the Poor: A Neglected Dimension of Latin American History," *Journal of Latin American Studies,* 23: 3, (Oct. 1991), 621-622.

[84] Mark David Spence, *Dispossessing the Wilderness: Indian Removal and the Making of the National Parks,* (New York: Oxford University Press, 1999); Karl Jacoby, *Crimes Against Nature: Squatters, Poachers, Thieves, and the History of American Conservation,* (Berkeley: University of California Press, 2001); Adam Rome, *Bulldozer in the Countryside: Suburban Sprawl and the Rise of American Environmentalism,* (Cambridge: Cambridge University Press, 2001).

[84] Robert D. Bullard, *Dumping in Dixie: Race, Class, and Environmental Quality,* (Boulder, CO: Westview Press, 1990); Robert Gottlieb, *Forcing the Spring: The Transformation of the American Environmental Movement,* (Washington D.C.: Island Press, 1993); Andrew Hurley, *Environmental Inequalities: Class, Race, and Industrial Pollution in Gary, Indiana, 1945-1980,* (Chapel Hill: University of North Carolina Press, 1995).

[85] According to Ramachandra Guha, of the 300 professional environmental historians in the United States, few look beyond their borders. See Ramachandra Guha, *How Much Should a Person Consume? Environmentalism in India and the United States,* (Berkeley: University of California Press, 2005), 227.

often draw upon capitalist or colonialist rhetoric to attack local land and water use practices for "destroying the natural world." Meanwhile, politically-engaged, morally-outraged environmental activists or Marxist critics deride what they see as nihilism in the various threads of postcolonial thought that are inspired by postmodernism or post-structuralist philosophy.[86]

However, there exists some potential for finding common ground in the study of the environmentalism of the postcolonial poor. Despite their differences with postcolonial assumptions and methods, scholars from Marxist traditions have challenged mainstream environmentalism and environmental histories of the United States by arguing for a global sense of environmentalism that accounts for the priorities of the postcolonial poor.[87] Ramachandra Guha and Joan Martinez-Alier embrace a nuanced and fragmented Marxism, rather than a disavowal of Marxist teleologies that characterizes postcolonial studies, but their work often mirrors postcolonial attempts to "provincialize" the universalizing claims of Eurocentric and American environmental movements.[88] For nearly two decades, Guha and Martinez-Alier have worked both

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86 Certainly, this conflation of postmodern and postcolonialism is problematic, as demonstrated by Kwame Anthony Appiah's seminal essay, "Is the Post- in Postmodernism the Post- in the Postcolonial?" *Critical Inquiry*, 20:2, (1994), 336-357. Yet, there are meaningful comparisons in how critics accuse "post" scholars of political apathy. For environmental critiques of postmodernism or postcolonialism see N. Patrick Peritore, *Third World Environmentalism: Case Studies from the Global South,* (Gainesville, Fl: University of Florida Press, 1999), 19-37; Ramachandra Guha, *How Much Should a Person Consume?* 33. For Marxist critiques of the postcolonialist turn in subaltern studies see the well-known debate between Prakash and O'Hanlan and Washbrook, see Rosalind O'Hanlan and David Washbrook, "After Orientalism: Culture, Criticism, and Politics in the Third World," and Gyan Prakash, "Can the 'Subaltern' Ride? A reply to O'Hanlan and Washbrook," and in Vinayak Chaturvedi, ed. *Mapping Subaltern Studies and the Postcolonial,* (London: Verso, 2000), 191-238.

87 Gadgil and Guha, *This Fissured Land*; Ramachandra Guha, *Environmentalism: A Global History,* (New York: Longman, 2000); Juan Martinez-Alier, *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation*, (Northampton, MA: Edward Elgar Press, 2002).

88 Chakrabarty, *Provincializing Europe*.

separately and in collaboration to explore the variety of environmental experiences of people in the global South.

Though useful for understanding the contemporary political dimensions of environmental discourses and social movements, such studies of global environmentalism offer relatively few insights into the ways in which *history* has been used to shape moralistic debates about defining "nature" and the proper use of environmental resources. Recent historical and anthropological scholarship points to the ways in which environmental discourses from the "developed world" tend to vilify or romanticize local actors and the native (or colonial) past, though they also challenge local environmentalists who project "green fantasies" onto indigenous peoples. Critical historians and anthropologists, in particular, have leveled devastating critiques against narratives of indigenous peoples as noble ecological savages living in harmony with the natural world according to ancient traditions.[89] History is not about objectively reconstructing past events, past lives, or even past environments and landscapes. For more than two decades, critical scholarship has pointed to the political dimensions of the production of historical or ethnographic knowledge. The widespread influence of the South Asian subaltern studies collective and postcolonial scholars, in particular, has convincingly demonstrated the connections between the production of knowledge and the consolidation of colonial and nationalist regimes of power.

Yet, subaltern studies also highlights how historical actors deploy new forms of resistance to totalizing regimes of power in order to reconstruct their own historical

[89] Shepard Krech III, *The Ecological Indian: Myth and History,* (New York: W.W. Norton and Company, 1999); Candace Slater, *Entangled Edens: Visions of the Amazon,* (Berkeley: University of California Press, 2002).

subjects, and periodizations that challenge the dominant narratives. In Mexico, a new language of nativist environmentalism emerged in the wake of the Papaloapan Projects. I am reluctant to think about these nativist environmental movements within the analytical rubric of "new social movements."[90] Instead it seems useful to understand nativist environmental movements, especially when linked to questions of indigenous rights, as a new way of entering the political sphere by reframing deep historical debates about the place of indigenous groups within the Mexican nation. Are environmentalist critiques really about the supposed "failure" to steward the land, or are they about something else? Could they be new articulation of popular politics open to certain actors at a particular historic moment? And how do they inspire us to rethink science and "modernity" considering the intrusions of "primitive" or "subjugated" knowledges? During the 1970s, while the Mexican state renewed its commitment to large-scale irrigation projects to promote development in the tropics of Oaxaca and Veracruz, a critical discourse emerged from anthropologists concerned with the loss of indigenous culture, as well as from indigenous activists who decried the destruction of their environments that resulted from government irrigation and fertilization programs. A language of environmental stewardship became politically salient in southern Mexico as government efforts to control and manage water resources faltered.

My point is not to write a "history from below," or to link the emergence of a nativist environmental discourse to any particular environmental or indigenous rights

[90]Following Peet and Watts, it seems that "the politics of the environment seem to embrace a wide terrain including not just new social movements, but transnational environmental alliances and networks, multilateral governance … that may not warrant the term 'movement." Richard Peet and Michael Watts, "Liberation Ecology: Development, Sustainability, and Environment in the Age of Market Triumphalism," in Richard Peet and Michael Watts, eds., *Liberation Ecology: Environment, Development, Social Movements,* (London: Routledge, 1996), 2-3.

movement or organization. Rather, the project is closer to Foucault's notions of "genealogy." Foucault defines genealogy as "the union of erudite knowledge and local memories which allow us to establish a historical knowledge of struggles and to make use of this knowledge tactically today." Genealogy forces scholars "to entertain the claims to attention of local, discontinuous, disqualified, illegitimate knowledges, against the claims of a unitary body of theory which would . . . order them in the name of some true knowledge and some arbitrary idea of what constitutes science and its objects."[91] Such a project also does the work of Dipesh Chakrabarty's "subaltern pasts," to disrupt "constructions of historicity that help us see the limits to modes of viewing enshrined in the practices of the discipline of history," which is about "struggling, or even groping, for nonstatist forms of democracy that we cannot yet either understand or envisage completely."[92] It requires that we "stay with heterogeneities . . . [that] put us in touch with the plural ways of being that make up our own present." The fragments of the past inhabit and create a disjuncture in the present.[93] According to Chakrabarty, subaltern histories, and the act of writing histories of subaltern knowledges, makes such a disjuncture visible, and force us to acknowledge that the "worlds of the past are never completely lost. We inhabit their fragments even as we envision ourselves as modern."[94] The politics of writing and reading histories (or genealogies) of subjugated knowledges collapses linear time into a present in which distinctions between ancient indigenous knowledges converge with and critique modern scientific knowledge,

91 Foucault, "Two Lectures," 83.

92 Chakrabarty, *Provincializing Europe*, 106-107.

93 Chakrabarty, *Provincializing Europe,* 108-109.

94 Chakrabarty, *Provincializing Europe*, 112.

blurring distinctions between “traditional” and “modern,” among “pre-colonial,” “colonial,” and “post-colonial.”

This study examines the Mexican state’s attempt to develop the Papaloapan River Basin as a way to rethink and reconcile environmental history and postcolonial studies at a moment when practitioners from both fields struggle with the implications of expanding their specializations to include Latin American case studies. For environmental historians, this study offers the possibility of extending the field to regions outside of the United States, without falling into the trap of defining Latin American environmental history strictly in terms established by Americanists. This study also contributes to debates within postcolonial studies by exploring the ways in which a nationalist-developmentalist state attempted to incorporate supposedly backwards, tropical peoples into the modernizing state by deploying state power and scientific experts to reconfigured local ecologies and local constellations of political power. Ultimately, the project seeks to rethink historiographical debates about the limits of state power and to excavate the genesis of a discourse of nativist environmentalism that emerged in the cracks of the Papaloapan projects. It may offer new theories of thinking about the complex ways in which local actors engage, understand, and manipulate new political openings. As such, a postcolonial environmental history of development in the Papaloapan Basin should cause us to revise dominant historical narratives about the one-party state and its dissidents in twentieth-century Mexico. The outline of such a revision is the subject of Chapter 2.

CHAPTER 2
THE MEXICAN LEVIATHAN

The Mexican Revolution of 1910 unleashed pent-up tensions as Mexicans overthrew the thirty four-year dictatorship of Porfirio Diaz (1876-1910). The social pressures spawned by the Revolution allowed for the emergence of one-party rule under the *Partido Revolucionario Institucional* (PRI). The origins of the PRI date to the late 1920s, when former president Plutarco Elías Calles organized a political party, the *Partido Nacional Revolucionario* (PNR), to consolidate his authority over the veteran officers of the armed phase of the Revolution following the assasination of the charismatic general, Alvaro Obregón. Through machinations within the party, Calles maintained power from behind the scenes until 1934, when his handpicked candidate for the presidency, Lázaro Cárdenas, challenged his patron's influence by reforming the Mexican army and replacing Calles's cronies in the official labor union, the *Confederación Regional Obrera Mexicana* (CROM). Cárdenas's six-year term in office, or *sexenio* (1934-1940), has been widely seen as the high point of revolutionary reform. Cárdenas redistributed land to peasants as collective farms called *ejidos,* a colonial tradition of communal land tenure superceded the Pre-colombian forms of kin-based land ownership. Cárdenas also maintained a populist public image and appealed to nationalist sentiment by nationalizing American and British oil companies. Cárdenas also reformed the official party, making it more broadly inclusive and renaming it the *Partido Revolucionario Mexicano* (PRM).

Under the reorganized party structure, the state stood as the final arbiter of disputes among various sectors of society that were incorporated into the party along

corporativist lines as functional sectors. Mexican political life was thus channeled through the party and was organized into Military, Industrial, Agrarian, and Popular sectors. The state would provide stability and allow competing political factions to resolve disputes within the party. Cárdenas would also favor stability in 1940, when he choose a conservative Catholic, Manuel Avila Camacho, over the more radical Francisco Múgica, as his presidential successor. The election of Avila Camacho signaled an end to radical revolutionary land reform and a reorientation of the Revolutionary state and the official Revolutionary party, which Avila Camacho renamed the *Partido Revolucionario Institucional* (PRI) in 1946. After 1946, Mexican presidents struggled to articulate a nationalist revolutionary vision in an era marked by capitalist development, foreign investment, and alignment with the United States during the Cold War. For supporters, the official party allowed for popular participation and continued the legacy of the Revolution and led to a period (1946-1970) of undprecedented economic growth dubbed "The Mexican Miracle." For detractors, the one-party state crushed dissent from a younger generation of Mexican leftists that witnessed post-war decolonization movements and revolutionary success elsewhere in the developing world, while their own "Revolutionary" government pursued capitalist development. Popular dissatisfaction with the PRIista state culminated in 1968 with the massacre of hundreds of student protestors who had gathered in the public square in Tlatelolco, a neighborhood just north of Mexico City's historic center.

After the Tlatelolco Massacre of 1968, Luis Echeverría, the Minister of the Interior who had been most directly responsible for the violence, was chosen as the official PRI candidate for the 1970 election. Though he tried to appeal to students and the Left by

recalling the populist mystique of the Cárdenas Era, Echeverría focused on large scale-rural development projects and borrowed heavily against oil futures, plunging Mexico into a debt crisis which climaxed in the early 1980s. Popular political resistance re-emerged as the autocratic nature of the PRI state become apparent when technical managers and economists trained in the United States implemented austerity measures informed by free-market dogmatism or "neo-liberalism." The political mobilization of Mexican civil society since the 1980s has led to the emergence of genuine opposition parties on the :eft [the *Partido Revolucionario Democrático* (PRD)] and the Right [Partido de Acción Nacional (PAN)], the Zapatista rebellion in the southern state of Chiapas, an overhaul of electoral law in the 1990s, the defeat of the PRI at the polls in 2000, and a historiographic reevaluation of the nature of the one-party state and its discontents.

This study follows recent trends in critically examining the nature of the PRI state after 1940. I focus on one of the largest state-led development initiatives of the postwar era, the Papaloapan River projects, to argue that an examination of popular discontent should not be limited to studies of urban civil society or the spectacular moments of agrarian revolutionary violence, as in the case of the Neo-Zapatista rebellion in Chiapas during the 1990s. Rather, I argue that relations with the state and rural Mexican society are better understood by being attentive to the evolving ways in which rural peoples confronted the flagship projects of post-1940s development. The history of the Papaloapan projects suggests that local indigenous groups consistently engaged with the state by asserting a discourse of "indigenous rights." In the early years of the projects in the 1940s and 1950s, local groups pressured the state to secure fair

indemnification for lost properties. As the scientific assumptions that underpinned agrarian development came under attack, local dissendents reworked a discourse of rights by asserting a newly salient political language of nativist environmental stewardship. This discourse made it possible to effectively challenge state–led development efforts in the 1970s. This history of the Papaloapan project and the forms of dissent that it inspired gives us pause and causes us to re-think environmentalism and "new social movements" in Mexico. It also challenges older historiographic understandings of the PRI state, "The Mexican Leviathan."

Breakfast of Revolutionary Unity

With the shift in state priorities after 1940, Mexican intellectual Daniel Cosío Villegas decried the end of the Mexican Revolution. As the contemplative, conservative Manuel Avila Camacho ascended to the presidency, Cosío Villegas lamented the end of the reform spirit that had animated the *sexenio* of Lázaro Cárdenas. Cosío Villegas believed that Avila Camacho and his successor, Miguel Alemán, would betray the agrarian ideals of the revolution and shift Mexican policies toward industrial developmentalism and collaboration with foreign capital. Historians of twentieth-century Mexico have often seen 1940 as the key turning point when the revolution became "institutionalized" under the direction of bureaucratic *politicos.* According to one scholar, the period after 1940 represented a time in which the Mexican state, "[c]laiming a revolutionary heritage . . . [wielded] a practical monopoly over the instruments of power."[1] Other commentators declared that the *Partido Revolucionario Institucional* (PRI) was "utterly dominant" in the postwar years. According to this interpretation,

[1] Peter Smith, "Mexico Since 1946: Dynamics of an Authoritarian Regime," in Leslie Bethell ed. *Mexico Since Independence,* (Cambridge: Cambridge University Press, 1991), 321.

government cooptation and repression of opposition groups, culminating in the massacre of student protestors at the *Plaza de Tres Culturas* in Tlatelolco in 1968, only served to consolidate PRI's hegemony.[2] Popular discontent after 1968 was channeled through writers and intellectuals, such as Carlos Fuentes and Octavio Paz, who would later be accused of collaborating with the regime.[3] Even the youth counterculture that fed the student movement became largely de-politicized after 1968.[4] According to this narrative, political opposition to PRI dominance only materialized as the debt crisis and neoliberal mismanagement of the economy in the late 1970s and early 1980s exposed the weaknesses of the Mexican political system, and allowed a variety of "new social movements" to threaten PRI hegemony.

In contrast to dissenters like Cosio Villegas, those who supported the institutional revolutionary party constructed an official historical narrative that erased the violent conflicts among various revolutionary factions and celebrated the party bureaucrats as the legitimate heirs to the revolutionary heritage. During the 1960s, the remaining veterans of the revolutionary struggles, "the spent cartridges of the Revolution," met each August at the "Breakfast of Revolutionary Unity."[5] In a profoundly symbolic gesture, government officials even united the mortal remains of revolutionary enemies

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[2] Thomas E. Skidmore, Peter H. Smith, James N. Green, *Modern Latin America,* seventh edition, (Oxford: Oxford University Press, 2010), 63.

[3] See Roger Bartra, *Blood, Ink, and Culture: Miseries and Splendors of the Post-Mexican Condition,* trans. Mark Alan Healey, (Durham: Duke University Press 2002); and Claudio Lominitz, *Deep Mexico, Silent Mexico*: *An Anthropology of Nationalism,* (Minneapolis: University of Minnesota Press, 2001).

[4] See Eric Zolov, *Refried Elvis: The Rise of Mexican Counterculture*, (Berkeley: University of California Press, 1999), 132-167.

[5] Thomas Benjamin, *La Revolución: Mexico's Great Revolution as Memory, Myth, and History,*(Austin: University of Texas Press, 2000), 137.

together inside the pillars of the Monument to the Revolution in Mexico City.[6] In1942, Venustiano Carranza's ashes were deposited in the pillars of the Monument. In 1960, his were joined by the remains of Francisco Madero, followed by the remains of Plutarco Calles in 1969, Lázaro Cárdenas in 1970, and Francisco "Pancho" Villa in 1976. Symbolically, old enemies came together in death to unite the nation in a single revolutionary family.[7]

The official historical narrative and the critical revisions that began after 1940 and culminated with the intellectual and political disillusionment following the Tlatelolco Massacre of 1968 represent opposing poles in historiography of twentieth-century Mexico. Proponents of the official narrative attempted to erase political and ideological differences. They also tried to impose political unity by co-opting various segments of society into party apparatus (in the 1930s, Cárdenas had expanded party membership to include the agrarian sector, the industrial sector, and the amorphous "popular" sector into the party), and increasingly, by repressing political dissent.[8] Those dissenters followed Daniel Cosío Villegas in declaring that state had betrayed the revolution. Each of these narratives, however, represents the state and the party as a single, monolithic

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[6] In Mexico City, I lived mere blocks from the Monument to the Revolution. I first came to realize the continuing power of the official history when a young school girl, who instantly recognized me as an extranjero, approached me to interview me for a class project. She asked, "Do you know about OUR great revolution against the horrible dictator Porfirio Diaz?" I replied that I did know of the revolution, and that I was interested in studying Mexican history. She beamed with pride and, after correcting my Spanish mispronunciations, she told me that the great monument behind us was a tribute to her history and her national patrimony.

[7] Enrique Florescano, *National Narrative in Mexico: A History,* trans. Nancy Hancock, (Norman: University of Oklahoma Press, 2006), 347-348.

[8] See Colin M. MacLachlan and William H. Beezley, *El Gran Pueblo: A History of Greater Mexico,* third edition, (Upper Saddle River, NJ: Prentice Hall, 2004), 377-409.

leviathan capable of either uniting all Mexicans, or completely crushing political opposition.[9]

This study challenges the assumptions of an all-powerful one-party state. Looking at a case study in which the state, through the Papaloapan Commission, wielded enormous power at the regional level, I explore how state officials, scientists, and engineers confronted the challenges of modernizing agricultural production in the southern tropics. In examining how state officials dealt with tropical nature and tropical people, one does not read the history of the expanding authority of an all-powerful "leviathan in the tropics." Instead, the story unfolds as a (mis?)adventure into uncharted territory. Despite the government's extensive attempts to reshape the environment and the social landscape of the Papaloapan Basin, their best efforts were hampered by the limits of ideologically-driven "scientific" knowledge, by the intractability of nature itself, and by the unwillingness of local people to embrace the government's mandates. .

Interpretations of the institutional revolutionary state after 1940 have been shaped, in large part, by the historiography of the revolution itself. Through the first half of the twentieth century, historians, both amateur and professional, as well as policy makers and popular culture producers constructed an official narrative of Mexico's recent history. An "almost mythical" story was driven by an "optimism born of faith in

[9] In many ways, the simplistic dichotomies constructed by these historigraphic debates parallel those constructed by historians who have examined the inequalities that defined colonial relationships. And indeed, my efforts to complicate such narratives have been inspired by the sophisticated work of postcolonial scholars who challenge the constructions of simplistic dichotomies while still describing unequal relations of power. For an early version of the colonial dichotomy see Albert Memmi, *The Colonizer and the Colonized,* trans. Howard Greenfeld, (London: Earthscan, 1990). For a more recent critique, see Frederick Cooper, "Conflict and Connection: Rethinking African Colonial History," *American Historical Review*, 99:5, (Dec. 1994), 1517.

the many promises of the Revolution and hope for a better future for all Mexicans."[10] Such interpretations served state officials who claimed to be the heirs to revolutionary traditions. In the official history, the violence and instability of the early twentieth century gave way to the institutionalized revolution under the guidance of Mexico's revolutionary presidents and the official party.[11]

According to Mexican historian, Enrique Florescano, the official history of the Revolution began to take shape with Francisco Madero's initial uprising of 1910. With Madero's call-to-arms, the very meaning of the word "revolution" was exalted as a "regenerative act of society." Along with Hidalgo's movement for independence and Benito Juarez's nineteenth-century liberal revolution, the 1910 uprising was reified as a force of Mexican history. It was "an autonomous process, independent of human action – a sort of hurricane that seemed to have been born from the foundations of history."[12]

As long as the goals of the revolution remained unfulfilled, however, revolutionary leaders evoked the memory of the revolutionary heroes and ideals to underscore their own programs and priorities. The institutional revolutionary party based its legitimacy on its self-ascribed duties to facilitate the "culmination and continuation of the Mexican Revolution." According to Thomas Benjamin, "[t]he revolutionary origins of the political

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[10] Thomas Benjamin, "The Leviathan on the Zocalo: Recent Historiography of the Postrevolutionary Mexican State," *Latin American Research Review*, 20: 3, (1985), 197.

[11] This official narrative finds contemporary resonance in the work of Mexican historian Enrique Krauze, who sees the Mexican presidents as the primary architects, the men who made the revolution. See Enrique Krauze, *Mexico, Biography of Power: A History of Modern Mexico, 1810-1996,* trans. Hank Heifetz, (New York: HaperPerennial, 1997).

[12] Florescano, *National Narratives in Mexico*, 314-315. It should be noted that while Florescano is critical of the "official history," he challenges other historians who have been critical of Mexican nationalism. He condemns the fragmentation of the literary turn and postmodernism, and he chides Mexican historians for neglecting their obligation to provide Mexicans with a "national" history. It is not, then, a broad national narrative that he rejects, merely the version promulgated by the state.

system and the system's faithful adherence to "*la Revolución"* have justified the existence of the system, the hegemony of the official party, and the authority of the successive regimes that take power every six years."[13]

By the late 1920s, just as Plutarco Calles attempted to hold together a fragile political coalition following the assassination of the charismatic general Alvaro Obregón, historians embraced the project of writing a unifying history of the revolution. Daniel Cosío Villegas, who would later head the prestigious *Colegio de México* and oversee the publication of a multi-volume history of Mexico, proposed a project to unify the revolutionary past with the present "so as to permit the revolution to continue in the future." Jesús Silva Herzog led the effort to establish The Historical Archive of the Revolution in order to celebrate the unique contribution of the various revolutionary leaders.[14] In addition, the education and cultural programs promoted by José Vasconelos, the Secretary of Education from 1921 to 1924, shaped an historic narrative of Mexican history that culminated with the achievements of the Mexican Revolution. The muralist movement, and particularly the work of Diego Rivera, displayed broad sweeps of Mexican history on the walls of government buildings. Rivera's mural on the staircase of the Presidential Palace, for example, presents a Manichean story of Mexican struggles from Pre-Colombian civilization through eventual triumph in a glorious Marxist Revolutionary future.[15]

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[13] Benjamin, *La Revolución*, 22-23.

[14] Benjamin, *La Revolución,* 141-144.

[15] Florenseco, *National Narratives,* 328-341; Desmond Rochfort, "The Sickle, the Serpent, and the Soil: History, Revolution, Nationhood, and Modernity in the Murals of Diego Rivera, Josø Clemente Orozco, and David Álfaro Siqueiros," in Mary Kay Vaughn and Stephen E. Lewis, eds., *The Eagle and the Virgin: Nation and Cultural Revolution in Mexico 1920-1940,* (Durham: Duke University Press, 2006).

The younger generations that came of age in the 1940s shouldered the responsibility of writing a history that could erase earlier factional divisions and unite the revolutionary party in a mission for national development. Prior to the 1940s and 1950s, conflicts among aging revolutionary generals, as well as strong disagreements between intellectuals who championed an *indigenista* version of Mexican history and assimilationists like José Vasconcelos, precluded a unified historical narrative of the revolution and its legacy.[16] In addition, prominent intellectuals like Cosío Villegas and Silva Herzog rejected the turn toward a more conservative institutional revolution. The PRI apparatchiks attempted to transcend ideological divisions and rally the nation around its goals by presenting a narrative in which the institutional party continued and extended the mission of the Revolution. In 1949, the party proposed a "History Competition of the Mexican Revolution" to find the work of history that "best provided 'an integrated, clear, and precise idea of the development of the political events of the Revolution.'"[17]

In 1951, a panel of judges selected a winner and the PRI published the *Historia de la Revolución Mexicana* by Alberto Morales Jiménez as the official party history. In the book's introduction, a PRI official noted that the party wanted "a history of the Mexican Revolution that the people can read. A lively book, one open to the future since *La Revolución* had not ended."[18] In 1969, perhaps as a response to growing political

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[16] Robert A Potash, "Mexican Historiography Since 1921," *The Hispanic American Historical Review,*40:3 (Aug. 1960), 392-402.

[17] Agustín Cue Canovas, "Notas de Historia," *El Nacional*, 27 September 1951, quoted in Benjamin, *La Revolución,* 148.

[18] José López Bermúdez, "Introducción: Nuestra Historia y sus Hombres," in Alberto Morales Jiménez, *Historia de la Revolución Mexicana,* (Mexico City: Instituto de Investigaciones Políticas, Económicas, y Sociales de PRI, 1951), xv; Benjamin, *La Revolución,* 148.

discontent, PRI published a brief pamphlet celebrating the achievements of the party since its inception as the *Partido Nacional Revolucionario* (PNR) in 1929. In *40 años del PRI al servicio de Mexico: 1929-1969,* a party spokesman celebrated how the institutionalization of the Mexican Revolution led to the "liquidation of the regime of the *caudillos*," brought workers and peasants into the political sphere, unified regional parties, and even promoted the political rights of women. Yet, despite such remarkable achievements, the party needed to "maintain political power" and "consolidate national sovereignty" because the "the revolution has not yet concluded." The author maintained that PRI must "permanently fight" for "the sovereignty and integrity of the nation … for economic development and social justice … for a climate of political stability and the perfection of democracy," and of course, "for world peace."[19].

Claims that the PRI "was the party of the twentieth century that looked to the twenty-first century," rang increasingly hollow in the 1970s and 1980s.[20] Following the disillusionment that culminated in the Tlatelolco Massacre of 1968, Mexican intellectuals expressed skepticism about the PRI's official history. Elena Poniatowska's oral history of the massacre sparked public outrage and writers like Carlos Fuentes became increasingly critical of the regime and its revolutionary claims.[21] In the classic novel, *The Death of Artemio Cruz,* Fuentes depicts a devoted PRI-ista yearning for the simplicity of his childhood as he dies in pain and loneliness, recalling all of the ways in which he has

[19] Partido Revolucionario Institutional, *40 años del PRI al servicio de Mexico 1929-1969,* (Mexico City: Partido Revolucionario Institutional, 1969), 24-25.

[20] PRI, *40 años,* 30.

[21] Elena Poniatowska, *Massacre in Mexico,* trans. Helen R. Lane, (Columbia: University of Missouri Press, 1991).

betrayed his family, his country, and his ideals.[22] According to one historian, after 1968, "Mexican scholars have found common ground in their emphatic rejection of the revolutionary state's official mythology."[23]

Historical Revision

By the late 1960s, scholars who had become disillusioned with the direction of the institutional revolutionary state, began questioning the legitimacy of the ruling party by challenging the official historical narrative that embraced all of the revolutionary leaders as part of a single "revolutionary family."[24] James Cockcroft's book on Mexican Liberal Party and John Womack's classic study of Emiliano Zapata refocused attention on the most radical elements during the armed phase of the revolution. Cockcroft drew attention to the anarchist workers and intellectuals whose critique of the Diaz dictatorship anticipated many of the radical arguments adopted by later revolutionaries. Womack's sympathetic, compelling portrait of Zapata recalled the injustices portrayed by earlier muckraking journalists and depicted the 'real' revolution as the agrarian struggle to reclaim indigenous ancestral lands from unscrupulous *hacendados.*[25] Anthropologist Eric Wolf, however, claims that it was a middling group of small

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[22] Carlos Fuentes, *The Death of Artemio Cruz,* trans. Alfred Mac Adam, (New York: Farrar, Straus and Giroux, 1991).

[23] Allen Wells, "Oaxtepec Revisted: The Politics of Mexican Historiography, 1968-1988," *Mexican Studies/Estudios Mexicanos,* 7:2 (Summer 1991), 333; Stanley Ross, ed. *Is the Mexican Revolution Dead?* (New York: Alfred A, Knopf, 1967).

[24] For early critiques of the official narrative see Guillermo Palacios, "La idea oficial de la 'Revolución Mexicana," Tesis de Maestria, Centro de Estudios Historicós, El Colegio de Mexico, 1969; Ilene O'Malley, *The Myth of the Mexican Revolution: Hero Cults and the Institutionalization of the Mexican State, 1920-1940,* (New York: Greenwood Press, 1986).

[25] See James D. Cockcroft, *Intellectual Precursors of the Mexican Revolution, 1900-1913*, (Austin: University of Texas Press, 1968); John Womack, Jr., *Zapata and the Mexican Revolution,* (New York: Vintage Books, 1968); for classic polemical accounts of the injustices of the Porfiriato and the radical, populist nature of the revolution see, John Kenneth Turner, *Barbarous Mexico*, (Austin: University of Texas Press, 1969) and John Reed, *Insurgent Mexico,* (New York: International Publishers, 1969).

landholders, the *rancheros,* who formed the most prominent revolutionary groups.[26] Others attempted to understand the agrarian violence of the Mexican Revolution in a comparative or deeper historical perspective by interpreting the revolution as part of a long history rural rebellion in Mexico.[27] Critics of this position argue that the focus on the agrarian struggle was based on erroneous understandings of rural power structures and land tenure systems. According to D.A. Brading, many of the assumptions about the agrarian struggle were based on the arguments of American scholars Frank Tannenbaum and George McBride who viewed the *haciendas* as backward feudal institutions and misunderstood the nature of Liberal land reforms of the nineteenth century. Instead, Brading and others argue that local powerbrokers, *caudillos,* were the primary beneficiaries of the changes in the nineteenth and early twentieth century changes. It was these local and regional strongmen, especially the contingent from the northern state of Sonora, who ultimately shaped the course of the revolution.[28]

Other scholars examined the variety of experiences at the local and regional level in order to de-center the official narrative.[29] Anthropologist Paul Friedrich's study, *Agrarian Revolt in a Mexican Village,* follows the agrarian movement led by Primo Tapia in Naranja, a Tarascan village in the state of Michoacán. At times Tapia followed the

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[26] Eric Wolf, *Peasant Wars of the Twentieth Century,* (New York: Harper and Row, 1969) 3-50.

[27] See Friedrich Katz, ed., *Riot, Rebellion, and Revolution: Rural Social Conflict in Mexico,* (Princeton: Princeton University Press, 1988).

[28] D.A. Brading, ed. *Caudillo and Peasant in the Mexican Revolution,* (Cambridge: Cambridge University Press, 1980), 1-16; Hans Werner Tobler, "Peasants and the Shaping of the Revolutionary State," in Friedrich Katz, ed., *Riot, Rebellion, and Revolution,* (Princeton: Princeton University Press, 1988), 487-518. . For Reference see, Frank Tannenbaum, *The Mexican Agrarian Revolution,* (Hamden, Conn., Archon Books, 1968); George McBride, *Land Systems of Mexico,* (New York: American Geographic Society, 1923).

[29] David C. Bailey, "Revisionism and the Recent Historiography of the Mexican Revolution," *The Hispanic America Historical Review,* 58:1 (Feb. 1978), 62-79; Wells, "Oaxtepec Revisited," 331-335.

revolutionary examples of Emiliano Zapata or, more likely Ricardo Flores Magón. Though, local conditions may have just as easily demanded that he oppose the revolutionary leadership of Plutarco Calles.[30] More recently, other local studies provide important counterpoints to the dominant revolutionary history. For example, Gilbert Joseph's early work on revolution in the Yucatán demonstrates how the priorities of the grassroots movement of Felipe Carrillo Puerta were derailed by the "The Revolution", and Romana Falcón's study of San Luis Potosí demonstrates the significant ways in which the national leadership negotiated and contested the authority of regional strongmen who deployed traditional patronage techniques to maintain local power.[31]

Each of these works undermines an official history that unites all of the revolutionary leaders into a single narrative in which the institutional state and the party were the legitimate heirs to a single revolutionary legacy. Above all, they undermine claims to revolutionary unity-in-factionalism. Other revisionist work presents even stronger critiques of the institutionalization of the revolution. In a monumental study of the Cristero Rebellion of the 1920s, Jean Meyer argued that the revolutionary government continued, rather than destroyed, the legacy of the Diaz dictatorship. The brutal defeat of catholic rural movements inaugurated a new authoritarian, capitalist state.[32] Adolfo Gilly proclaims that the revolts of the Villistas in the North and the

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[30] Paul Friedrich, *Agrarian Revolt in a Mexican Village,* (Chicago: University of Chicago Press, 1977).

[31] Gilbert M. Joseph, *Revolution From Without: Yucatán, Mexico, and the United States, 1880-1924,* (Cambridge: Cambridge University Press, 1982); Romana Falcón, *Revolución y Caciquismo: San Luis Potosí, 1910-1938,* (Mexico City: Colegío de Mexico, 1984).

[32] Jean Meyer, *The Cristero Rebellion: The Mexican People Between Church and State, 1926-1929,* trans. Richard Southern, (Cambridge: Cambridge University Press, 1976). Mexican Historian Lorenzo Meyer makes a similar pint in "Historical Roots of the Authoritarian State in Mexico," in José Luis Reyna and Richard S. Weinert, eds., *Authoritarianism in Mexico,* (Philadelphia: Institute for the Study of Human Issues, 1977), 3-22.

Zapatistas in Morelos represented the "real" revolution. For Gilly the revolution peaked with the Convention at Aguascalientes in 1914 and was defeated by the Constitutionalist forces under Alvaro Obregón and Venustiano Carranza, who were, naturally, not real revolutionaries. Gilly admits to being more of a Marxist polemicist than a historian and claims that his history of the revolution "is a work of political and cultural struggle, chosen … as a personal weapon with which to resist the oppression and arbitrariness of an absurd prison system." Above all, Gilly intended his book as "a tool with which to prepare a continuation of the struggle for Marxism and a working-class programme in Mexico and Latin America."[33]

Due in part to chronological and analytical proximity, few revisionist historians have focused directly on the institutional revolutionary state, though political scientists have devoted significant attention to the authoritarian PRI state. Historian Peter Smith and political scientist Roderic Ai Camp have each devoted considerable attention to the biographies of Mexico's political elites. Smith concludes that Mexico's political elite did not necessarily represent the dominant economic interests, though he does affirm that "Mexico has created and maintained an unquestionably 'authoritarian' regime."[34] José Luis Reyna deployed the concept of "populist corporatism," to define the institutional revolutionary state. According to Reyna, populist corporatism encourages mass political mobilization in order to "*de*mobilize the class groups that can formulate demands." Put another way, despite displaying some of the democratic forms that PRI

[33] Adolfo Gilly, *The Mexican Revolution,* expanded and revised edition, trans. Patrick Camiller, (London: NLB, 1983), 8. William Roseberry argues that scholars should move beyond an "agrarian question," that evaluates peasant activism only in terms of the potential for radical, Marxist organization. See Roseberry, "Beyond the Agrarian Question," 318-370.

[34] Peter H. Smith, *Labyrinths of Power: Political Recruitment in Twentieth-Century Mexico,* (Princeton: Princeton University Press, 1979), 3.

officials might celebrate, political "participation and mobilization [in Mexico] are carefully controlled for nondemocratic ends."[35] Even as many political scientists have recently shifted their gaze to focus on the "transition to democracy" marked by Vicente Fox's victory in the 2000 election, scholars continue to attack the repressive aspects of PRI's seventy year rule. Donald Hodges and Ross Gandy highlight Mexico's authoritarianism by championing the variety of popular resistance movements to the official party.[36]

Historical scholarship has tried to undermine the official narrative, and the structural analysis of political scientists has attempted to devise new models for thinking about Mexico's unique political system. However, much of the revisionist work leaves in tact the notion that the PRI created a hegemonic state in the mid twentieth century. Beginning in the late 1980s and early 1990s, scholars influenced by the work of the Subaltern Studies collective and by the cultural turn began to look more closely at the ways in which the revolutionary state was constructed through everyday encounters and through the fragments of popular culture.

New Directions

Ironically, as new ways of thinking emerge, there has been something of a shift back to writing epic histories of the Mexican Revolution. With a two volume history of the revolution, Alan Knight attempts to present a definitive narrative of the initial armed phase, and Friedrich Katz's monumental biography of Pancho Villa recalls an earlier

[35] José Luis Reyna, "Redefining the Authoritarian Regime," in José Luis Reyna and Richard Weinert, eds., *Authoritarianism in Mexico,* (Philadelphia: Institute for the Study of Human Issues, 1977), 161; Richard Weinart, "Introduction," in Reyna and Weinert, eds., *Authoritarianism in Mexico,* xiii.

[36] Donald Hodges and Ross Gandy, *Mexico Under Siege: Popular Resistance to Presidential Despotism,* (London: Zed Books, 2002).

focus on the heroes and prominent men that made the revolution.[37] Since the early 1990s, however, a growing number of scholars have focused considerable attention on the ways in which various social groups participated in shaping both the culture and politics of the revolutionary state. The publication of Gilbert Joseph and Daniel Nugent's *Everyday Forms of State Formation: Revolution and The Negotiation of Rule in Modern Mexico* and a special issue of the *Hispanic American Historical Review* devoted to cultural history highlighted key historiographic trends.[38] Re-evaluating the history and historiography of the Mexican Revolution, historians have begun exploring not only how official history was constructed, but how narratives of modern Mexico silenced or obscured the ways in which broad segments of Mexican society participated in the process of state formation throughout the twentieth century. Contributors to Joseph and Nugent's edited collection raise pointed questions about the ability of post-revolutionary leaders to construct a hegemonic state. Instead, the authors of the theoretical and empirical studies present a thematic interpretation to show how efforts at state formation constantly confront popular culture and local political practices in mutually constitutive negotiations.

Scholars who follow this line of thinking focus on cultural negotiations between the revolutionary state and local actors, though many limit their research to the 1930s, when agrarian populism of Lázaro Cárdenas presented unique political openings. For

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[37] Alan Knight, *The Mexican Revolution,* 2 vol., (Lincoln: University of Nebraska Press, 1986); Friedrich Katz, *The Life and Times of Pancho Villa,* (Stanford: Stanford University Press, 1998).

[38] Gilbert Joseph and Daniel Nugent, eds., *Everyday Forms of State Formation: Revolution and the Negotiation of Rule in Modern Mexico,* (Durham: Duke University Press, 1994); *The Hispanic American Historical Review*, Vol. 79, No. 2, Special Issue: Mexico's New Cultural History: Una Lucha Libre (May, 1999); See also Florencia Mallon, "The Promises and Dilemmas of Subaltern Studies: Perspectives from Latin American History," *American Historical Review,* 99:5 (Dec. 1994), 1491-1515.

example, Marjorie Becker, argues that peasants, particularly *campesino* women, influenced the course of the Cárdenas administration by forcing Cárdenas and his educational "shock troops" to moderate their militant anti-clericalism.[39] Though, critics protest that Becker echoes the arguments of earlier revisionist historians and lacks sufficient evidence to demonstrate clear links between popular culture and the highest levels of government decision-making.[40] Mary Kay Vaughan covers similar ground by demonstrating how the construction of the institutional state was built on a foundation of "negotiation between the central state, regional, and local actors over definitions of nation and community, culture and modernity, citizenship and history."[41] Vaughan argues that peasants contested Cárdenas's socialist education reforms as they influenced the revolutionary agenda and mobilized in support of the Cárdenas regime. According to Vaughan, the stability and longevity of Mexico's one–party state resulted from such local negotiations of state priorities. She claims that "[a]s local societies accepted, discarded, and altered aspects of the state's project, they … forged new identities and linkages … [that gave people a] sense of membership and participation in a national mobilization for modernity."[42]

Increasingly, scholars extend arguments about negotiations between the state and popular culture to study the period after the 1940. Anne Rubenstein's study of

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[39] Marjorie Becker, *Setting the Virgin on Fire: Lázaro Cardenas, Michoacán Peasants and the Redemption of the Mexican Revolution,* (Berkeley: University of California Press, 1995).

[40] See Thomas Benjamin, "Review: Marjorie Becker, *Setting the Virgin on Fire: Lázaro Cardenas, Michoacán Peasants and the Redemption of the Redemption of the Mexican Revolution,* (Berkeley: University of California Press, 1995)," *The American Historical Review,* 102:2, (April 1997), 587-588.

[41] Mary Kay Vaughan, *Cultural Politics in Revolution: Teachers, Peasants, and Schools in Mexico, 1930-1940,* (Tucson: University of Arizona Press, 1997), 4.

[42] Vaughan, *Cultural Politics in Revolution,* 7.

comic books explores how Mexicans engaged modernity through the narratives, production, and consumption of comic books, and Eric Zolov argues that Mexican youth counterculture re-appropriate American rock-and-roll music to challenge dominant political and cultural values.[43] In the ambitious and wide-ranging collection, *Fragments of a Gold Age: The Politics of Culture in Mexico Since 1940,* historians and cultural critics argue that "the politics of culture constitutes one of the keys to understanding Mexico after 1940 . . . that the PRI's cultural regime was inextricable bound up with the political economy of the nation."[44]

Despite the impressive breadth of empirical studies that range from an analysis on the mechanization of tortilla production to the spectacle of *Lucha Libre*, cultural historians of the period since 1940 define popular culture too narrowly and avoid direct confrontation with the best articulated state priorities. I contend that scholars should broaden understandings of cultural contestation to consider how government officials encountered the natural world and indigenous groups, and how local actors engaged the major government development schemes in the mid twentieth century. I argue that debates over science and nature, conservation and development, national identity and indigenous culture each represented key cultural "fragments" that scholars need to address in order to move beyond caricatures of the PRI as a hegemonic juggernaut.

This study challenges important facets of the historical narrative by focusing on the environmental and cultural history of the key government programs of the mid

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[43] Anne Rubenstein, *Bad Language, Naked Ladies, and Other Threats to the Nation: A Political History of Comic Books in Mexico,* (Durham: Duke University Press, 1998); Zolov, *Refried Elvis.*

[44]Gilbert M. Joseph, Anne Rubenstein, Eric Zolov, "Assembling the Fragments: Writing a Cultural History of Mexico Since 1940," in Gilbert M. Joseph, Anne Rubenstein, Eric Zolov, eds., *Fragments of a Golden Age: The Politics of Culture in Mexico Since 1940,* (Durham: Duke University Press, 2001), 15.

twentieth century, the Papaloapan River projects and the agricultural modernization undertaken by the Rockefeller Foundation. The public works and agricultural colonization projects in the Papaloapan River Basin were initiated by Miguel Alemán in 1947 and were re-invigorated with the construction of the Cerro de Oro Dam in the 1970s before the projects fell into decline by 1982. By looking closely at these government public works initiatives, I assert that "everyday forms of state formation" were not limited to the armed phase of the Mexican Revolution and its immediate aftermath, or to the populist Cardenas era when political openings for peasants and workers allowed certain groups to exercise a degree of political influence.[45] By doing so, I challenge the notion of a dominant state and see limits to PRI dominance and hegemony. Even in a situation in which a government bureaucracy, the Papaploapan Commission, was given extraordinary local authority, the state's power was limited by internal divisions within the state bureaucracies and by local conditions and local peoples. The shortcomings of the state's initiatives allowed new forms of political contestation to emerge in southern Mexico. Informed by travelers, Indianist scholars, local activists, and a new generation of agricultural scientists, a discourse of nativist environmentalism emerged to challenge the government's efforts to manage natural resources according to scientific principles.

The emergence of nativist environmentalism in southern Mexico challenges our understanding of Mexican political history in a number of important ways. First, it exposes the fragility of the one-party state, especially in the tropical provinces that often

[45] See Becker, *Setting the Virgin on Fire;* Christopher Boyer, *Becoming Campesinos: Politics, Identity, and Agrarian Struggle in Postrevolutionary Michoacan, 1920-1935,* (Stanford: Stanford University Press, 2003).

remained far from Mexico City's control. Second, it tempts us to rethink the nature of the political turning point of the late 1960s and early 1970s. The era is generally marked by the Tlatelolco Massacre in 1968 and is often seen as a moment in which the PRI consolidated its authority through violence and repression. Yet, the government's recommitment to rural development through public works and large-scale irrigation projects in the early 1970s, combined with Luis Echeverria's attempts to conjure to populist magic of the Cárdenas regime, actually demonstrated the weakness of the state in the tropical south. Thus, 1968 represents something other than the end of popular discontent. Instead, the late 1960s and early 1970s were a time when subaltern actors began to reframe older arguments about indigenous access to natural resources into a new environmentalist discourse that allowed them to manipulate state policies and priorities. Finally, the rise of nativist environmentalism in southern Mexico challenges understandings of environmental movements in Mexico. Often depicted as either a middle class movement focused on the quality of life in Mexico City, or as a state initiative with little popular support, environmentalism in Mexico should include notions of environmental justice and the environmental priorities of the marginalized poor.[46]

[46] Lane Simonian *Defending the Land of the Jaguar*; Daniel Faber, "The Ecological Crisis of Latin America: A Theoretical Introduction," *Latin American Perspectives*, 19:1, (Winter 1992), 3-16.

CHAPTER 3
THE RIVER OF BUTTERFLIES

This chapter describes the origins of the government agency, known as the Papaloapan Commission, which was charged with developing the tropics of southern Mexico. It also examines how the Tennessee Valley Authority in the United States inspired Mexican policy makers in the administration of President Miguel Alemán to undertake an ambitious program of agricultural development. The Papaloapan Commission centralized decision-making power to coordinate development of the Papaloapan Basin as an integrated whole. As such, Commission officials relied on the expertise of economist and agronomists to design a comprehensive plan for the construction of public works, the resettlement of Mazatec Indians displaced by the construction of the Miguel Alemán Dam, and the commercial agricultural development of the lower basin. I argue that the continuing influence of a discourse of "the tropics" which imagined tropical nature as dangerous but potentially productive if cultivation could be wrested away from "primitive" tropical peoples, led government planners to reify "scientific" knowledge and disregard local, indigenous adaptations to the natural world. As such, many of the Papaloapan Commission's endeavors from the late 1940s through the early 1970s failed to achieve the Alemán administration's goals. The shortcomings of the early development schemes, however, established the terms of later debates over agricultural development in the humid tropics. While government planners increasingly relied on scientific expertise to bring tropical nature to heel and to transform indigenous *campesinos* into commercial farmers, the problems with centralized planning schemes sowed the seeds of popular discontent and a revaluation of traditional knowledges.

Under President Miguel Alemán, the Mexican state undertook an ambitious program to control and harness the rushing waters of the Papaloapan River. The river begins its journey to the sea in the highlands of Oaxaca, and meanders through southern Puebla before traversing the state of Veracruz and pouring into the Gulf of Mexico. Initially proposed to protect against devastating floods, the Papaloapan River Project became a massive undertaking to reshape both the land and the people of the southern tropics. State planners and middle class *chilangos*, residents of Mexico City, projected a vision of the south that drew upon long-held notions of "the tropics." Whereas the north had been industrializing as a result of proximity to the United States, the southern tropical regions of Mexico remained remote, backwards, and indigenous. The tropical lowlands of Veracruz held a tremendous reservoir of untapped resources, unrealized potential, though they also harbored the threats of tropical disease and uncontrolled nature. With the paternalism of the post-revolutionary state and the careful management of scientific experts, the Papaloapan projects were to harness tropical nature for the benefit of the nation, and bring tropical peoples into modernity, simultaneously protecting them from the dangers and vicissitudes of wild tropical nature.

The Papalaopan projects were first conceived during the early 1940s as a government reponse to frequent flooding in the highlands of Oaxaca. However, during a period of postwar faith in the power of technology and science to reshape nature, and to remake society, the Papaloapan projects became a far more intrusive state intervention in the Mexican tropics. The projects were initiated by the administration of Mexican President Miguel Alemán in 1947. Alemán followed the priorities of his predecessor, Manuel Avila Camacho, in pursuing new developmental priorities as the

Mexican Revolutionary state shifted away from a focus on radical land reform after 1940. Alemán sought a closer relationship with the United States, and fully supported the Allied cause during World War II and American anti-communism during the earlier years of the Cold War. He encouraged foreign investment and promoted agrarian development as a means of subsidizing food prices for nascent industrial development. For Alemán and his successors, rural development projects like those in the Papaloapan Basin allowed the state to maintain a discursive commitment to the agrarian populism of the Cárdenas Era, while pursuing capitalist industrial development in the polarizing geopolitical context of the Cold War.

As a centerpiece of the post-1946 developmental schemes and the so-called "Mexican Miracle," the state initiated the Papaloapan Projects with the initial coinstruction of road and communications networks in the basin. The construction of the Miguel Alemán Dam began in the early 1950s, and was accompanied by the construction of a new urban center for the Papaloapan Commission's headquarters in Ciudad Alemán. The Commission constructed irrigation works and attempt to bring new lowland territories in Veracruz into production for commercial agriculture. It also oversaw the resettlement of Mazatec Indians displaced by the dam in new agricultural colonies that soon became experiment stations for implementing modern agricultural techniques developed by the Rockefeller Foundation.

Tropical nature proved more intractable, however, as thin tropical soils could not support hybrid seeds for corn, wheat, and beans that had been developed in more temperate zones and relied on heavy applications irrigated water, chemical fertilizer, and pesticides. In addition, design flaws in the Miguel Alemán Dam led to the corrosion

and decay of hydraulic pumps so that the dam failed to provide irrigation for both the state-run colonization schemes and the commercial agricultural enterprises in the lower basin. By the late 1950s and early 1960s, the agrarian colonies were abandoned and commercial development was limited to small pockets of rice or sugar production near the river or pineapple production near Loma Bonita. Much of the basin that had been cleared for development or agricultural colonization was soon turned over to pasture for cattle ranching. During the 1960s, the Papaloapan Commission faced competition for dwindling resources from other government agencies as the priorites of subsequent presidents increasingly focused on industrialization in the north. Visitors in the 1960s "were struck by the deteriation of the physical constructions and the general listlessness of the programs."[1]

The projects even failed to control the flood waters of the Papaloapan River. Floods continued to devastate settlements in the highlands and threatened the new commercial agricultural enterprises in the lower basin throughout the 1960s. The original flood control plans called for the construction of two dams, but state planners chose to focus early construction budgets on the cheaper, but less effective Miguel Alemán Dam. As the projects languished in the late 1950s and early 1960s, the state would only commit resources for constructing a second dam, the Cerro de Oro Dam, in the early 1970s as President Luis Echeverría refocused state priorities on rural development. In the 1970s, however, planners faced opposition from a loose coalition of activists that questioned the scientific assumptions underpinning the state's plans and championed local, traditional knowledge. The state would eventually abandon

[1] Peter T. Ewell and Thomas T. Poleman, *Uxpanapa: Agricultural Development in the Mexican Tropics,* (New York: Pergamon Press, 1980) 34.

development schemes in the Papaloapan Basin by the late 1970s and early 1980s. When new sources of oil were discovered along the Gulf Coast of Veracruz, the federal government turned away from agrarian development under the Papaloapan Commission and shifted resources to the state-run oil company Petróleos Mexicanos (PEMEX) for exploration and development of the petroleum industry. The Commission was finally disbanded in 1982 following the accidental deaths of two top officials.

Against the Fury of Nature

On September 27, 1944, the Mexico City newspaper, *El Universal*, announced to the nation that "Tuxtepec has practically disappeared."[2] During the previous three days flood waters rose and engulfed the streets of the highland Oaxacan town that stood precariously along the left bank of the Papaloapan River. The strength and duration of the late summer rains caused the river to overflow its banks as waters rose rapidly over just a few days. Finally on Saturday, September 23, a hurricane ripped through region and the waters rose between four and nine meters in the lower barrios.[3] In December 1944, the poet Manuel Castillo Estrada lamented that Tuxtepec had once been the Jewel of the Papaloapan, the "River of Butterflies." Tuxtepec was a "land of dreams and … poetry."[4] In 1944, however, the small mountain town was nearly wiped off the face of the earth. Reports told of houses destroyed and streets littered with cadavers. The lower barrios were completely flooded and observers called on the governor of

[2] "Tuxtepec ha desapaecido prácticamente," *El Universal,* 27 September 1944, quoted in Tomas Garcia Hernandez, *La Tragedia de Tuxtepec,* (Tuxtepec, Oaxaca: H. Ayuntamiento Constitucional de San Juan Batitsa Tuxtepec, 1994), 10.

[3] Garcia Hernandez, *La Tragedia de Tuxtepec,* 10-12

[4] Manuel Castillo Estrada, "La Tragedia de Tuxtepec," in Garcia Hernandez, *La Tragedia de Tuxtepec,* 43.

Oaxaca and the President of the Republic to send aid in order to prevent the development of catastrophic epidemics.[5] In 1948, a group of travelers noted the lasting evidence of the flood when they saw water damage that reached eight feet high on the walls of their hotel. In the nearby town of Cosamaloapan, the visitors walked across raised concrete sidewalks built to accommodate frequent flooding. Residents had also constructed makeshift fortifications of barbed wire and sticks to prevent erosion and flood damage.[6]

Despite the devastation, Tuxtepecanos commemorated the sacrifices of "anonymous heroes" who "battled against the fury" of "nature" to save people in trees and trapped atop their own devastated houses. The president of the nearby municipality of Tierra Blanca, Ernesto Garcia Ferro, sent clothes and medicine to help the survivors, and a leading *vecino* named Roberto Herrera pleaded for federal assistance. In a telegram to President Manuel Avila Camacho, Herrera said that seventy five percent of the town's population had been killed by floods that "totally destroyed" the community. Those that were "miraculously" saved needed federal aid to provide food and medicine, to maintain civil order, and to clear away the putrid, decaying bodies of the dead.[7]

Floods frequently inundated the lower Papaloapan basin. There had been recorded floods in 1787, 1888, 1921, 1922, 1935, 1941, and 1944.[8] In the first major

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[5] "Tuxtepec ha desaparecido prácticamente," 10.

[6] "Visit to Lush River Basin Opens Door to Adventure," *The Christian Science Monitor,* 4 June 1948, 13.

[7] Correspondence: Roberto Herrara to Manuel Avila Camacho, 26 September 1944, quoted in Garcia Hernandez, *La Tragedia de Tuxtepec,* 12.

[8] Sara J. Scherr and Thomas T. Poleman, *Development and Equity in Tropical Mexico: Thirty Years of the Papaloapan Project,* (Ithaca, NY: Cornell University, Department of Agricultural Economics, 1983), 30.

study of the Papaloapan Basin, José Noriega concluded the high incidence of flooding was the result of both man-made and natural causes. Due to natural erosion and to deforestation, siltation of the lower basin caused the banks of the Papaloapan River to rise above the surrounding flood-plain. When heavy rains caused the river waters to overflow their banks, water rushed *downhill* and pooled in the surrounding lands, flooding towns and villages with putrid, fetid water. With the storms of 1944, for example, approximately 200,000 hectares of land in the lower Papaloapan basin was flooded.[9]

In October 1944, Mexican President Avila Camacho toured the devastated flood region with Oaxaca Governor Sánchez Cano. The president declared that the state should take charge of providing a series of improvements for the residents of Tuxtepec. First, the state committed resources to help local residents to clean and recondition the streets, and to build "works of defense" against future floods. The state would provide credit for *ejidatarios*, ranchers, and merchants to rebuild their lives. The president promised to provide potable water for the city, and expanding the mandate beyond the immediate need to rebuild the town, Avila Camacho committed the federal government to a building an electrical energy plant.[10] The river, it seemed, provided the potential for increased energy production, not only for the residents of Tuxtepec, but for the nation. Such an undertaking required the government to look beyond the immediate problem of flood control and to consider a much larger intervention in the region. For a centralizing

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[9] See, José Noriega, "Control del río Papaloapan: Preparación del plan de estudios definitivos y programa de construcción de las obras," *Ingeniera hidráulica en Mexico*, I, (April- June 1947, July-September 1947) cited in Thomas Poleman, *The Papaloapan Project: Agricultural Development in the Mexican Tropics,*(Stanford: Stanford University Press, 1964), 90-91.

[10] Garcia Hernandez, *La Tragedia de Tuxtepec,* 13.

Mexican state, "flood protection by itself … [had] a limited, ambiguous impact on the structure of society and power."[11] However, for Avila Camacho and his successor, Miguel Alemán, protecting Tuxtepec from flooding justified an ambitious program to reshape the constellations of power and society in the Papaloapan River basin. In the process, the Mexican leaders attempted to bring the people and natural resources of the region into the service of a modernizing, developmentalist national vision.

President Alemán and his Minister of Hydraulic Resources, Adolfo Orive Alda, visited the United States and came away inspired by the achievements of the Tennessee Valley Authority (TVA). During an official visit to Mexico in March 1947, US President Harry Truman symbolically reinforced close diplomatic relations between the United States and Mexico, despite disagreements over an economic aid package. In a meeting near the ancient pyramids of Teotihuacan just north of Mexico City, Truman honored the famed "*niños heroes,"* Mexico's child heroes who sacrificed themselves in nationalist pride rather than surrendering to invading US troops in the 1840s. Truman proclaimed, "'brave men don't belong to any one race or country … I respect bravery whenever I see it" and invited Alemán to visit the United States.[12] The next day, Alemán accepted Truman's offer and prepared to tour the country as an official guest of the nation.[13] American commentators urged crowds in United States to receive the Mexican president with a genuine spirit of understanding and friendship, not only with the pomp and ceremony of brass bands and parades, though "these token

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[11] Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West,* (New York: Oxford University Press, 1985), 20.

[12] Milton Bracker, "Truman, Aleman Find Some Discord," *The New York Times*, 6 March 1947, 3.

[13] "Aleman Will Return Visit" *The New York Times,* 8 March 1947, 5.

arrangements are of course important in their place." More significantly, Americans should strive for "the sort of spontaneity that leads people to acclaim Senor Aleman with an informal 'Hi Mike!' as he rides by."[14]

Alemán's itinerary included spending the night as a guest of the White House, a visit to New York and West Point, a trip to receive an honorary degree from the University of Kansas, and a visit to Chattanooga, Tennessee to view the installations of the Tennessee Valley Authority.[15] Flying on Truman's private plane, "The Sacred Cow," Alemán arrived in Tennessee on May 5, 1947, and declared his enthusiasm to "tour …'a great experiment [that] has been realized which serves not only as an inspiration to [the United States] but also to other democracies."[16] Starting out early in the morning the following day, the Mexican president met with Gordon R. Clapp, G.O. Wessenhuaer, Lee Karr, and C.E Blee of the TVA and toured the Chickamauga Dam and powerhouse. Studying the dams and hydroelectric facilities of the TVA with Orive Alda "at his elbow every minute," Alemán "shot up and down in elevators and tramped up and down stairs to watch water run through the turbines, to ponder the working of generators, and to see the opening and closing of lock gates." After his tour, Alemán declared, in the construction of the TVA projects, "one finds the authentic spirit of the democracies. For indeed, the democracies, instead of employing their resources to oppress and exterminate, use them to open sources of life everywhere … and the democracies

[14] "Greeting for Aleman," *The Washington Post,* 13 March 1947, 6. In his memoirs, Alemán recalled being overwhelmed by the warm receptions he received in both Washington and New York. See Miguel Alemán Valdes, *Remembranzas y testimonios,* (Mexico City: Grijalbo, 1986), 263-278.

[15] "Aleman to Visit TVA during his Trip to US," *The New York Times,* 10 April 1947, 10.

[16] "Arrives at Chattanooga," *The New York Times,* 6 May 1947, 31.

struggle against the elements to place them at the service of mankind."[17] Following the violence of World War II, the future struggle for democracies, aided by technological and scientific innovations, was not the domination of fascism, but the domination of nature.

After touring the facilities, Alemán met with a fisherman who landed a medium-sized catch from the reservoir created by the Chickamauga Dam, and continued his tour by flying to the chemical fertilizer plant at Muscle Shoals, Alabama.[18] Upon returning to Mexico, Alemán "shunned all official engagements" as he prepared to address the nation on the results of his visit to the United States and the TVA. According to commentators, Alemán had already conceived of a project in the Papaloapan Basin modeled on the TVA, but he faced the critical problem of obtaining funding. His finance minister, Ramón Beteta, had secured promises of $90 million to $100 million in credits from the Export-Import Bank in Washington, but Mexico still hoped to secure more funds from a World Bank loan. According to one commentator, "the uncomfortable fact remains … that the site [in the Papaloapan Basin] is likely to remain as arid as ever unless the World Bank acts."[19] Though the projected costs of the Papaloapan projects approached $200 million, Alemán ordered "the immediate start of preliminary work" once the Mexican government officially secured the $100 million advance from the Export- Import Bank in Washington. Orive Alda outlined "an undertaking far greater

[17] Virginia Lee Warrens, "Aleman Views TVA To Aid Home Plans," *The New York Times,* 7 May 1947, 16.

[18] Warrens, "Aleman Views TVA," 16.

[19] Milton Bracker, "Mexicans Ponder Results of Tour," *The New York Times,* 11 May 1947, 25.

than any public work previously attempted," in Mexico. He described a series of water management works in the Papaloapan Basin modeled on the TVA.[20]

In administrative terms, Orive Alda described the TVA as a decentralized government agency, "under total and absolute responsibility," charged with the planning and implementation of major and minor improvements to the Tennessee River Basin. The term, decentralized, is misleading in the sense that it refers to a bureaucracy that did not have to defer to the decision-making authority of the federal government. But, in fact, power was highly concentrated in the hands on the TVA. One author argues that the TVA had "quasi-dictatorial" authority.[21] The TVA was responsible for "harmonious[ly]" managing tensions between the development of natural resources and conservation for "the social and economic well-being of the majority of the inhabitants of the country." According to Orive Alda, the TVA had demonstrated that such state intervention was both "politically efficient and convenient" as a way "to channel the agricultural and industrial development in the basin, always working under the basic idea to obtain the best benefit and the conservation of natural resources."[22] Mexican officials followed their New Deal counterparts from the United States in thinking that only a scientifically-informed state agency, not the idiosyncrasies of private enterprise or

[20] "Aleman Orders Work Started on 'TVA' River Plan," *The Washington Post,* 16 May 1947, 5.

[21] Marc Riesner, *Cadillac Desert: The American West and Its Disappearing Water,* rev. ed. (New York: Penguin Books, 1993), 135.

[22] Adolfo Orive Alda*, El Tennessee y El Presidente Frente al Papaloapan,* Conference with the Asociación de Ingenieros y Architecos, 18 June 1947, AGN 609/38 MAV*,* 6-7.

the ancient practices of indigenous communities, could plan and coordinate the ambitious effort to promote both conservation and development.[23]

The model provided by the TVA offered government planners a significant innovation in the practice of water management. Under the authority of the TVA, a powerful bureaucracy controlled an entire river basin as a single unit. Such a new conceptualization allowed planners to disregard potentially destructive practices in some regions if additional benefits accrued to other areas. As long as the government's actions proved beneficial in aggregate, planners could ignore the consequences of locally devastating, or economically infeasible, public works. In the United States, conceptualizing river basins in their entirety encouraged a peculiar form of accounting and evolved into a policy of building so-called "cash register dams," dams to produce high-value hydroelectricity, in order to subsidize the construction of economically risky, ill-conceived irrigation projects.[24]

The TVA had been commissioned as a way to address issues of poverty in the U.S. South during the Great Depression of the 1930s. For many in the Tennessee River Basin, major economic activities had centered on the production of cotton on small parcels of land. The average quality of life was lower in the region than the median for the United States as a whole, as many small cotton farmers earned less than $150 each year.[25] As in other agricultural regions, the cotton belt of the U.S. South was devastated by the drop in agricultural prices that precipitated bank foreclosures and

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[23] See Donald Worster, *The Dust Bowl*: *The Southern Plains in the 1930s,* (Oxford: Oxford University Press, 1979) for a discussion of scientifically-informed environmental management efforts during and immediately after the New Deal.

[24] Riesner, *Cadillac Desert,* 134.

[25] Orive Alda, *El Tennessee,* 6-8.

sent the United States deep into the Great Depression. In an effort to address such problems in the South, in 1932, Franklin D. Roosevelt commissioned the TVA as the agency dedicated to the agricultural and industrial development of the region. The primary task of the TVA involved the construction of a series of multi-use dams. Each dam could function to provide hydroelectricity in order to facilitate industrialization, though each also served to control flooding and provide water for irrigation agriculture. In addition to the construction of dams, the TVA also sought to foment the conservation and fertilization of the soils, to control erosion, to encourage crop rotation, and to increase agricultural production by providing synthetic nitrogen fertilizers.[26] While in the United States, President Alemán was thoroughly impressed, and inspired, as he toured the synthetic fertilizer plant that the TVA had constructed at Muscle Shoals.[27]

Distribution of nitrogen and phosphate fertilizers was the key to the TVA's attempts to foster agricultural development in the region. The agency distributed fertilizer packets that came complete with instructions for increasing agricultural yields to midsized farms. In addition, the TVA offered its clients access to the counsel of scientific agricultural experts. Officials hoped that "the rest of the community of the basin would follow their neighbors who [had] triumphantly employed the new agricultural techniques and induce[d] [greater yields than were possible] with other systems."[28] The TVA was also charged with the tasks of reforestation of the valley to prevent erosion and with the eradication of pests. To accomplish such a task, TVA officials periodically

[26] Of course, later environmental activists would decry the use of chemical fertilizers, but during the 1930s and 1940s they seemed to offer the possibility of raising crop yields without permanently depleting soils, which, people figured, could always be re-enriched with more chemicals.

[27] Orive Alda, *El Tennessee,* 6-8.

[28] Orive Alda, *El Tennessee,* 9.

managed reservoir levels to discourage the growth of mosquito larvae, constructed sanitation works, liberally applied the pesticide DDT (which the famous American environmentalists, Rachel Carson, would later decry as an abomination against all natural life), and conducted medical analyses of the inhabitants of those areas particularly endangered by pestilence and disease. The combined works of the Tennessee Valley Authority took fourteen years to complete, at a total cost of approximately $750 million, most of which was allocated to the cost of dam construction and the construction of chemical fertilizer manufacturing plants. Between 1933 and 1947, The TVA built twenty-two dams, with a total capacity for 1,770,000 kilowatts of hydroelectricity and an additional 430,000 kilowatts of thermoelectricity.[29]

Inspired by the ambitious undertakings of the Tennessee Valley Authority, Alemán championed the project to apply similar solutions the problems of development in the Papaloapan Basin, a region with a comparatively "backwards" population that had frequently been devastated by fluvial floods. The floods devastated the region and *campesinos*, who had been first drawn into a relationship with the state through the land reforms of Lázaro Cárdenas, looked to the federal government for solutions to their problems.[30] As word of government plans for the Papaloapan River emerged in early 1947, the *Comisarido Ejidal de "Santa Teresa" de Tuxtepec, Oaxaca*, led by President Rafael Hernandez, Secretary Julian Ramirez, and Treasurer Timateo Rodriguez, petitioned the government to rebuild a school that had been destroyed by the 1944 flood. In a telegram directly to President Alemán, the *ejido* leaders offered "most

[29] Orive Alda, *El Tennessee,* 9-10.

[30] See Christopher Boyer, *Becoming Campesinos: Politics, Identity, and Agrarian Struggle in Postrevolutionary Michoacan, 1920-1935,* (Stanford: Stanford University Press, 2003).

sincere congratulations," and declared that the *ejido* members were "hoping confidently for the realization of the great works on the Papaloapan River." They hoped that such projects would bring great benefits to the region. In particular, they asked the president for special concessions to help their community. Their school, they explained, had been "totally destroyed during the floods of …1944." The *ejido* leaders pleaded with the president to help them by allocating resources from a school construction program run by the Secretary of Public Education to rebuild their devastated schoolhouse. Before signing off with the revolutionary slogan, "*Tierra y Libertad,"* the *ejido* leaders of Tuxtepec declared that the realization of this project "is their greatest desire."[31]

Before settling on the Papaloapan Basin as the site for the ambitious public works projects, administrative officials considered sites on four other rivers, Rio Grivala (which would ultimately become the site of another major development project), Rio Usumacinta in the Lacondon Jungle, Rio Pánuco, and Rio Coatzacoalcos. Officials ultimately selected the Papaloapan River because, as Olive Alda claimed, it "constituted a serious and constant threat" due to the intensity of the fluvial flow and the dangers presented by periodic floods that could cause "irreparable harm to life."[32] Once he explained how the choice of site had been settled, the Secretary of Hydraulic Resources waxed poetic about the possibilities for hydro-electrification, "rapid" agricultural and industrial development, and the beneficial use of the resources of the region. Orive Alda exclaimed that the projects would be the "most important in the Republic, with [modernization of] agriculture and industry resulting in benefits for not only the

[31] Correspondence: *Comisarido Ejidal de "Santa Teresa" de Tuxyepec, Oaxaca,* to Miguel Aleman, January 1947, AGN 609/38 MAV.

[32] Olive Alda, *El Tennessee,* 14-15.

inhabitants of the region or [even just] the states of Oaxaca and Veracruz, but for all of the Republic."[33]

Commentators predicted that American technicians and scientific experts would support the Mexican construction efforts. In a scathing critique of a fiscally-conservative U.S. Congress, a columnist from *The Washington Post*, followed US Secretary of Agriculture Clinton Anderson in claiming that if Congress succeeded in scaling back reclamation work in the United States, scores of "top technicians and experts who understand how to work with soil and water to make the earth give forth its abundance … [men who] do not grow on trees" would be available for employment on Mexican public works projects. Such a development would be desirable, according to Truman administration officials, because the American experts could "at least be kept in this hemisphere, where they would help to build the productivity of a good neighbor."[34]

Miguel Alemán asked his subordinate, Orive Alda, to announce detailed plans for the Papaloapan projects before an association of engineers and architects on June 18, 1947.[35] Orive Alda issued a comprehensive report that first outlined the types of natural resources in the Papaloapan basin in a basic form that reflected an understanding of nature in terms of human utilization. The report continued by comparing the successes of the Tennessee Valley Authority projects, which had so inspired President Alemán during his recent visit to the United States, with the prospects for similar development projects in southern Mexico. Finally, Orive Alda explained the actions the president had already taken to initiate development in the Papaloapan basin.

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[33] Olive Alda, *El Tennessee,* 15.

[34] Marquis Childs, "Washington Calling: Soil Conservation," *The Washington Post*, 2 May 1947, 6.

[35] Orive Alda, *El Tennessee*.

After a brief introduction, Olive Alda yielded to a spokesman for the *Congresso Mexicano de Ciencias Sociales*, who described the natural resources of the Papaloapan basin. The government relied on such experts because they "expose[d] the modern scientific thought," that President Alemán valued so highly.[36] The scientists explained, briefly, that natural resources could be divided into two categories. First, oil and mineral deposits represented non-renewable resources, while soils, water, vegetal, and animal life, including humans, represented renewable resources, "resources vital to the entire nation."[37] However, the scientists proclaimed, none of these resources had any inherent value in themselves. Only when they existed simultaneously with complementary resources that could be harvested and put to use through human ingenuity did natural resources have any real value. Soils needed water to be productive, and vice versa. Soil could be enriched or depleted, vegetable and animal life constantly evolved, all "resources have a past and a future… Life can create life." All that was needed was human management and engineering to bring together the key factors of soil, water, and air.[38]

Moreover, according to the panel of experts, the responsible use and conservation of these natural resources was fundamental for the life of the nation. Clearly, agricultural production depended on the wise use of resources, but the scientists believed that social problems were also linked to relations between the human

[36] Orive Alda, *El Tennessee,* 2.

[37] Orive Alda, *El Tennessee,* 3.

[38] Orive Alda, *El Tennessee,* 3.

and the natural world.[39] Though it was dynamic and evolving, for Mexican scientists there existed a "perfectly clear" relationship between natural resources and human communities. In language that would continuously link development and exploitation with conservation, the panel declared that "good conservation and utilization" brought happiness, while "misuse occasioned misery and grave calamities." Fostering good use and conservation required "rational deliberation and a plan or general *technical* scheme to understand and improve the harmony of all resources, particularly renewable resources" [emphasis added]. Such a plan or scheme should "consider the present in light of the past and use the data to obtain the security of the future."[40] According to such thinking, only scientists and engineers possessed the acumen and skills to discern the important links between the past and the present, and only they had the expertise to devise a plan for the future. They declared that, "by the light of modern science, with … clarity for the country, [they hereby] advance[d] a plan for the Papaloapan River based in the Tennessee Valley Authority of the United States."[41]

As the spokesman for the president, Orive Alda declared that Alemán wanted to accomplish a series of ambitious goals in the Papaloapan Basin. Reflecting the official justification for the projects, the president's first priority involved controlling devastating fluvial floods. Following the example of the TVA, Alemán and his advisors called for a series of dams that could, in addition to controlling flood waters, provide cheap

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[39] Marxists might understand this in terms of relations to the means of production, though for Marxists, as for capitalists, the natural world might be viewed as little more than the raw materials for industrial production. To wit: in both capitalist and Marxist thought, nature is reduced to "commodities" or "natural resources" or "means of production."

[40] Orive Alda, *El Tennessee,* 4-5.

[41] Orive Alda, *El Tennessee,* 5.

hydroelectricity for industrialization. Furthermore, government planners stretched their imaginations to conceive of a concerted effort to improve sanitation by supplying potable water, and to connect the remote region with the rest of the nation by increasing avenues of communication, navigable waterways, railroads, and telegraph lines to new centers of population and industrial or agricultural development. In this effort, Orive Alda declared that the president asked the audience of engineers and architects for "unity of action" so that the community of technical experts and the administration could "integrally attack the problem."[42]

Initially, the president considered the project to be under the administrative supervision of the Secretary of Hydraulic Resources, but following the example of the TVA, he "realized the need for the creation of an organism" that could independently study and resolve all the problems that presented critical obstacles for completing the projects. To that end, Alemán had already created the *Comisión de Papaloapan* on February 26, 1947, prior to his visit to the United States. Officially, the commission was entrusted "to plan, to design, and to construct the works required for the development … of the Papaloapan Basin." The commission also facilitated and coordinated communications between the Secretary of Hydraulic Resources and officials directly appointed by the president.[43]

As the first order of business, Alemán and Orive Alda challenged the commission to complete a series of initial projects. First, he asked that medical director of the Papaloapan Commission take charge of a study aimed at the eradication of disease,

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[42] Orive Alda, *El Tennessee,* 16.

[43] Orive Alda, *El Tennessee,* 16-17.

especially those gastrointestinal ailments that were associated with unsanitary water, intestinal parasites, and tuberculosis. Such diseases "disgracefully [still] exist[ed] in parts of the basin." In addition, the commission's sanitation engineer was asked to construct works to supply potable water and sewage systems to drain the fetid waters (*aguas negras*) of marshy and flooded areas.[44] Orive Alda closed his presentation to the engineers and architects by warning them of both the hardships and the opportunities that lay ahead. He reminded the audience that the Tennessee Valley projects took fourteen years to complete and cost $750 million. The grand crusade of Mexican development would require no less. "And so" he proclaimed, "the Papaloapan, yesterday considered a constant threat and an inexploitable resource, will be tomorrow a source of wealth unequal in [the history] of our country."[45]

Since the Papaloapan Basin remained far from Mexico City, in terms of both physical distance and popular imagination, Alemán commissioned scholars from the *Universidad Nacional Autónoma de México* (UNAM) to conduct a series of academic surveys of the region. The president asked the department of anthropology to conduct an ethnographic survey, focused on indigenous languages, cultures, bodies. Scholars were to accord special attention to dietary deficiencies of people who might become possible allies for development plans. Biologists were to conduct a comprehensive survey of the flora and fauna of the basin, while geologists were responsible for identifying potential dam sites, sources of subterranean water aquifers, and potential lodes of mineral deposits. Other commission officials labored to identify those natural

[44] Orive Alda, *El Tennessee,* 18.

[45] Orive Alda, *El Tennessee,* 21.

resources that could be successfully exploited and those that should be conserved. The commission's Planning Director took charge of coordinating the other studies and articulating a comprehensive plan for the "harmonious development all the resources of Papaloapan," though clearly the Alemán administration placed a priority on the potential for economic development.[46] In 1947, alone, the Mexican government allocated $1,400,000 (USD) for preliminary research and construction.[47]

For Alemán and others, development of the region in a way that also promoted conservation of natural resources was a key to both the economic and the moral progress of the nation. Though Alemán's administration is usually associated with graft and corruption, his focus on conservation demonstrates a more morally ambiguous image that should cause scholars to reevaluate the complex nature of the man and his presidency.[48] Alemán was typical of Mexican government officials after 1940. Following Lázaro Cárdenas, the presidential administrations of mid-century focused on development driven by the priorities of Import Substitution Industrialization and large-scale agro-business. However, the Alemán administration recognized the need to promote conservation of Mexico's natural resources, not for environmental reasons, but to ensure that industrial development and the export-led agricultural sectors could grow and thrive into the future. In addition, despite the clear emphasis on industrial

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[46] Orive Alda, *El Tennessee,* 19-20.

[47] "Mexico's Flood Control Plans," *The Wall Street Journal,* 12 January 1948, 13.

[48] It should be noted that this is not an attempt to rehabilitate Miguel Alemán, who probably rightly deserves the condemnations that critics have leveled against him for his unscrupulous approach to development and his tolerance of the misdeeds of his subordinates. However, if we are to take seriously his morally-charged proclamations conservation, as Simonian does, then we should dispense with caricatures and aim for more complex and nuanced evaluations of the man and his presidency. See Lane Simonian, *Defending the Land of the Jaguar: A History of Conservation in Mexico,* (Austin: University of Texas Press, 1995), 115-124.

development after 1940, Alemán and subsequent Mexican presidents wrestled with the monumental political legacy left by Cardenás and his influential forestry minister, Miguel Angel de la Queveda, who is memorialized by a metro station in the wealthy Mexico City neighborhood of Coyoacan. Alemán promoted reforestation projects aimed at preventing soil erosion, and he firmly believed that development and conservation could be compatible goals if government planners could implement projects, like those in the Papaloapan Basin, based on scientific expertise.[49]

Orive Alda's report clearly demonstrated that key officials in the Alemán administration, including Alemán himself, felt a keen awareness of environmental limitations and a dedication to conserving natural resources. However, the report also reflected the modernist faith that a culturally-sensitive science could rationally manage natural resources for the exclusive benefit of humanity, particularly those segments of humanity associated with large-scale agriculture and industry. Echoing earlier statements regarding the role of democracies in shifting priorities away from the destructive technologies of war to the productive efforts to scientifically-manage natural resources, Alemán addressed the opening session of the second General Assembly of the United Nations Education, Scientific and Cultural Organization (UNESCO). In the November 1947 speech, Alemán warned against the destructive excesses that science made possible, but he looked optimistically toward a future in which "UNESCO [would] promote science … to find ways and means whereby all nations shall share in its benefits and collaborate in its development."[50]

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[49] Lane Simonian, *Defending the Land of the Jaguar*, 121-125.

[50] "Culture Must Guide Science, UNESCO Told," *The Washington Post,* 11 November 1947, 3.

Alemán's presidential successors continued to express faith in the benefits of scientific management of natural resources. Under Adolfo Ruiz Cortines (1952-1958) the government launched a forestry campaign aimed at teaching peasants to use their lands and forest resources more rationally, otherwise the benefit of government public works would be undermined. Adolfo Lopez Mateos followed his predecessors and called for a forest management program that was "'neither romantic nor demagogic, but rational and scientific."'[51] Mid-century presidential administrations disparaged indigenous and peasant knowledge and championed scientific rationalism, not only as the means to economic development, but also as the key to environmental conservation. Subsequent chapters will explore the ways in which the Papaloapan projects fit among broader endeavors to modernize Mexican agriculture according to scientific dictates. Scientific management of natural resources would have dramatic consequences for both the land and the people of the Papaloapan Basin (and beyond) as Green Revolution technologies, such as hybrid seeds and chemical fertilizers, reshaped the agroecology of the region and created new relationships between the state and the *campesinos*.

Into the Tropics

Following the public announcement of the Papaloapan projects, Alemán made plans to visit the river basin in the summer of 1947, as the government was inundated with letters. A wide variety of people, from residents of the region to American engineers who had worked on the Tennessee Valley projects, requested jobs with the

[51] Adolfo Lopez Mateos quoted in Simonian, *Defending the Land of the Jaguar,* 124-125.

Papaloapan Commission and the Department of Hydraulic Resources.[52] Upon learning that the Mexican government was planning a series of projects modeled on the TVA, Americans Jack Lockhart and Herbert Higgins confidently informed president Alemán that "many engineers now working with the Tennessee Valley Authority are interested in the project even to the extent of seeking employment."[53] Alemán's executive spokesman, Eduardo Chávez, thanked the American engineers for their interest, but assured them that the government had already hired all of the "technical personnel" that they required. However, Chávez explained that, in the event of future job openings, he would happily accept American "contributions to our works."[54] In addition to petitions from job seekers, the Mexican president received letters of welcome and congratulations from local power brokers in the Papaloapan Basin. Both the Governor of Oaxaca, Eduardo Vasconcelos, and the President of the Tuxtepec Chamber of Commerce, Ildefonso Bravo, expressed their enthusiasm for the President's upcoming visit and the economic boon that the Papaloapan projects promised. According to Bravo, the business leaders of Tuxtepec "offer their sincere collaboration to realize the gigantic works that [the government] undertakes to forge the economic greatness of the nation."[55]

In 1948, Orive Alda toured the Papaloapan Basin as well. In the highlands of Oaxaca, he found an isolated part of Mexico defined by both primeval wilderness and

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[52] See Correspondence: Manuel J. Cházaro A. to Miguel Alemán, 5 June 1947, AGN 609/38 MAV

[53] Correspondence: Jack Lockhart and Herbert Higgins to Miguel Alemán, 5 August 1948, AGN 606.3/185 MAV.

[54] Correspondence: Eduardo Chávez to Jack Lockhart and Herbert Higgins, 25 August 1948, AGN 606.3/185 MAV.

[55] Correspondence: Ildefonso Bravo to Miguel Alemán, 19 July 1947, 609/38 MAV; Correspondence: Eduardo Vasconcelos to Miguel Alemán, 21 July 1947 MAV.

unassimilated Indians. A reporter who accompanied Olive Alda declared that a simple government progress inspection was "an adventure in itself," into an exotic Papaloapan Basin that was a "[g]ateway to the [p]ast," though the region was "about to flow into the 20th century [sic]." The minister's entourage traveled by jeep over unpaved roads and had to be ferried across streams and rivers on barges. Throughout the region, the group encountered both wild nature and Indians living in "various states of civilization." They often heard "a screech or a more melodious note coming from the thick layers of vegetation on both sides of the road;" they passed "palm huts and saw a few people in white cotton and straw hats." Continuing down the river by boat, the government inspection party turned their attention away from the primitive highlands. Focusing on the agriculturally productive lowlands of Veracruz, they toured the pineapple growing center of Loma Bonita, Mexico's largest sugar refinery at San Cristobal, and arrived in the colonial center of Tlacotalpan, "the pearl of the Papaloapan." Predicting the future development of the region, Minister Orive Alda proclaimed that Alvarado, the port city at the mouth of Papaloapan River, would soon eclipse Veracruz as the nation's main export depot, and a commentator declared that the "sublime tranquility" of Tlacotalpan would soon be ended with the construction of a highway linking the region to Mexico City.[56]

The trip downriver through Loma Bonita and Tlacotalpan to Alvarado would become the standard tour for official visitors. And the narrative of a wild jungle inhabited by primitive Indians being brought into an agricultural modernity by government magnanimity, would become the standard trope of the early Papaloapan story. In 1949,

[56] "Visit to Lush River Basin Opens Door to Adventure," *The Christian Science Monitor,* 4 June 1948, 13.

another visitor recalled flying over the region and seeing runoff canals built to protect indigenous communities whose inhabitants lived in "houses like the sideless ones of the Seminoles of Big Cypress Swamp, Florida." Yet, houses under construction by the Papaloapan Commission, "were far superior to those in which the natives previously lived." For observers, as well as government planners, the works in Papaloapan represented efforts at both social engineering and environmental management. For visitors, "it was emphasized that Papaloapan project is not only an engineering one, but is basically a work of a social and human character in which the transformation of natural resources is for the benefit of the people and the country." By 1949, commentators believed that "the natives [were] already enjoying this oasis in the jungle desert."[57]

The early efforts of the Papaloapan Commission focused on bringing modernity to the tropical region by controlling floods and the tropical diseases that flourish in standing water, connecting the region to the nation with new roads, and bringing the "backwards" tropical peoples into a new "modern" agricultural society. During the first phase of construction, the Papaloapan Commission implemented the recommendations that José Noriega had proposed after the devastating flood of 1944. The plans called for constructing multi-purpose dams to control floods, provide run-off for irrigation, and provide hydroelectricity. However, since the most likely sites for dam construction were located in inaccessible mountain valleys, the Commission first had to undertake a program of road and infrastructure construction. Thus, the first years of the Papaloapan projects were defined by *"proyectismo"* and a preference for large scale public works.

[57] Mabel F. Knight, "Two Big Mexican Projects Develop Housing and Water," *The Christian Science Monitor,* 27 July, 1949, 10.

The centerpiece of the early construction projects was the Miguel Alemán Dam, which spanned the Rio Tonto, the most significant tributary feeding into the Papaloapan River. When it was constructed, the dam was one of the largest public works projects in Latin America. The Commission also focused on constructing two major highways and a new town, Ciudad Alemán, to house their official headquarters. The first highway connected Ciudad Alemán to the Mexico City-Veracruz highway, and the second ran downriver from Ciudad Alemán to Tlacotalpan near the Gulf of Mexico. Ciudad Alemán itself was laid out to eventual accommodate 150,000 inhabitants, though there already existed several well established towns nearby.[58]

Though the Papaloapan Commission expended most of its resources on the large public works constructions, officials were also eager to reshape the social landscape by relocating the indigenous populations of the Oaxacan highlands who would be displaced by the dam and other construction projects. Many people sought employment on the construction projects, or in a cement factory near Ciudad Alemán that supplied materials for construction. For those dislocated by the dam, however, the Commission proposed an ambitious resettlement project. The reservoir created by the Alemán Dam held 8,000 million cubic meters of water and covered almost 50,000 hectares of land that had once been home to 22,000 Mazatec Indians. Under the auspices of the *Instituto Nacional Indigenista* (INI), the dislocated Mazatecas were relocated to resettlement zones in the lower Papaloapan Basin.[59]

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[58] Poleman, *The Papaloapan Project,* 101-103.

[59] Poleman, *The Papaloapan Project,* 115.

In 1952, the first Mazatec colonists were resettled onto uninhabited lands that had been appropriated by the government in a region called Las Naranjas. Initially, 417 families settled on 3300 hectares. By 1954, the Papaloapan Commission and the INI had established five new agricultural colonies at Zapata, Oaxaca, Las Naranjas, Resumidero, and Independencia.[60] Planners hoped that moving the highland Indians to the new agricultural zones would disrupt traditional patterns of subsistence farming on small *ejidal* plots, and shift the priorities to commercial agriculture directed by agronomists and Commission officials. Planners feared "that new settlers would fall into traditional subsistence patterns in the face of the numerous technical and social difficulties of moving into the 'jungle' [without the guidance of the Papaloapan Commission]"[61]

Commission officials followed a paternalistic approach to supporting the colonists in Las Naranjas. Essentially, they provided each family with an already operational, commercial farm. The Commission provided land that the Alemán administration had been purchasing piecemeal since 1950. The Commission cleared the land using machinery and hired laborers and brought in the colonists only weeks before the planting season began. Each family received "an attractive house constructed of milled lumber and palm thatching." The houses were arranged in the pattern of a typical Mazatec village. Small, "urban" plots were only large enough to keep a family garden and maybe some chickens, and slightly larger family plots were allocated for commercial agriculture using modern methods and technologies.

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[60] Scherr and Poleman, *Development and Equity in the Mexican Tropics,* 55-61.

[61] Scherr and Poleman, *Development and Equity in the Mexican Tropics,* 60.

The Commission forced the indigenous colonists to agree to their supervision and guidance by controlling access to credit. The Commission did not give the indigenous families immediate ownership. Instead officials asked settlers to sign a "settlement agreement" that gave them free rent for a year and access short term operational loans. After a yearlong probationary period, settlers who conformed to the standards established by the Commission were given the option to sign a "purchase contract." Those who failed to follow Commission protocols were expelled from the land. The purchase contracts mortgaged the land to indigenous families at inflated prices and compelled the colonists to "continue obeying any instructions with respect to cropping and soil conservation practices."[62]

Despite early enthusiasm, the initial colonization efforts failed completely within four years. Commission officials based their recommendations on insufficient research and they distrusted local land use practices. Officials allowed colonists no flexibility to innovate or improvise local solutions to the difficult problems of commercial agriculture in the humid tropics. Furthermore, the Commission proved unable to fulfill government promises to provide water for irrigation because of a design flaw in the Miguel Alemán Dam. Rather than employing gravity irrigation techniques, the Commission built hydraulic pumps to extract water from the Rio Tonto. Due to high costs and maintenance lapses, the pumps soon became corroded and unusable and the Commission suspended irrigation operations. Many of the colonists turned to local

[62] Poleman, *The Papaloapan Project,* 131; 127-135

sugar refineries for credit.[63] By 1956, half of all colonists were in arrears. Many families left or were expelled from their lands. By 1957, government credit dried up completely and cattle ranchers acquired much of the cleared land.[64] Government officials continued to believe that indigenous agricultural practices had caused the commercial farms to fail, and they continued to promote a shift to "modern" agricultural practices in subsequent development schemes.

Not everyone affected by the Papaloapan Commission's construction projects chose to participate in the relocation programs. Almost immediately, petitions from those destined to experience only destruction and displacement as a result of the construction, began flooding the offices of the president and the Commission. From 1947 to 1949, The National Confederation of Campesinos campaigned on behalf of a number of peasants like, Jesus Ortiz Ruiz of Tuxtepec, Oaxaca, whose lands were destroyed during the construction of the dam.[65] *Campesinos* also pooled their resources to obtain legal assistance. Attorneys writing on behalf of a group calling themselves The Society of the Woods of Papaloapan demanded that the government publicize the exact costs of construction and the exact projections of the extent and location of the total surface area that would be flooded as the reservoir rose behind the Miguel Alemán Dam. The tone of the letter suggests a defensive posture as the attorneys prepared to protect the rights and property of their clients. Challenging the power of the state to

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[63] Alicia Barabas and Miguel Bartolomé, *Hydraulic Development and Ethnocide: The Mazatec and Chinantec People of Oaxaca, Mexico,* (Copenhagen: International Work Group for Indigenous Affairs, 1973), 4-19.

[64] Scherr and Poleman, *Development and Equity in the Mexican Tropics,* 60.

[65] Correspondence: Robert Barrios to the Jefe del Departamento Agrario, Comisión del Papaloapan, 25 April 1949

appropriate private property, they declared defiantly that under such extreme circumstances, "protest is necessary."[66]

The Alemán administration finally responded to protests by officially declaring that certain property owners would be compensated for the loss of lands, houses, or valuable agricultural holdings, particularly fruit trees.[67] All petitions for indemnification were to be directed to the Papaloapan Commission's legal affairs office, and the Commission officials devised criteria to determine eligibility for compensation. As construction commenced, individuals and *ejido* leaders, peasants and *hacendados* alike, tried to secure compensation for damaged land and property.

Between May and June 1954, Joaquin Caceres Riera sent a series of letters to the head of the legal department of the Papaloapan Commission on behalf of his brother, a former *hacendado* named Dr. Josemanuel Caceres Riera. The letters requested indemnification for property, the "ex-hacienda Santa Margarita, which had been inundated when the Presidente Alemán dam finally became operational. The Caceras Riera brothers claimed that the property occupied territory on the right bank of the Rio Tonto, an area that had to be evacuated as water levels rose behind the dam. The Caceres Riera brothers protested against the government's inaction, claiming that they "know definitely" that the response would have been quite different if "the affected estate had been some *ejido* and at the same time included lands of peasants who were destined for relocation."[68] The legal struggle dragged on for two more years until

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[66] Correspondence: Daniel Leyna Aragon, Carlos Ugalde Leger, Ernesto Deytz Mendoza to Secretary of Hydraulic Resources, 28 June 1949. AHA Caja 65/ Exp. 831

[67] *Diario Oficial: Organo del Gobierno de los Estados Unidos Mexicanos*, 10 December 1949.

[68] Correspondence: Joaquin Caceras Riera to Maclovio Sierra de la Garza, 4 June 1954, AHA Caja 1/Exp. 0101.

Papaloapan Commission officials agreed to recognize that the hacienda had been located in an evacuation zone.[69] However, the Commission still refused to indemnify the *hacendado* for damages to his property. Perpetually tying up the case in a labyrinth of bureaucracy, the Commission's Director of Land and Colonization, Candido Cruz Lopez, repeatedly claimed that he could not pass any final judgment without "some other information."[70]

Candido Cruz Lopez also denied the claims Sr. Hernendez Peréz of Cordoba, Verecruz. The Commission section director challenged the veracity of Hernedez Peréz's argument by claiming that the water levels never rose high enough to flood the disputed property. Cruz Lopez claimed that construction on the dam began in January 1949, and was completed in October 1953. At that point the water was only at a level of 28.10.[71] By July 1954, the water level reached 46.24. In October 1955, it was 55.11. By December 1957 it climbed to 60.91 before stabilizing at 67.37 by August 1958. According to Cruz Lopez, at no point did the water reach 70.00, the level which he calculated would be required to damage the property of Sr. Hernandez Peréz.[72]

The Papaloapan Commission responded favorably to some claims for indemnification, particularly small claims. According to the presidential decree of 26 October 1949, the government agreed to pay for any damage to "cultivation and

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[69] Correspondence: Papaloapan Commission Legal Director Alonso Landa y Cuevas to Joaquin Caceras Riera, January 1956 – April 1956, AHA Caja 1/Exp. 0101.

[70] Correspondence: Candido Cruz Lopez to Dr. Josemanuel Caceras Riera, 16 April 1956, AHA Caja 1/Exp. 0101.

[71] Correspondence: Candido Cruz Lopez to Sr. Hernendez Peréz, 14 November 1961, AHA Caja 3/ Exp. 0038. Cruz Lopez does not indicate the unit of measurement, however. It may be reasonable to assume that the figures were given in meters.

[72] Correspondence: Candido Cruz Lopez to Sr. Hernendez Peréz, 14 November 1961, AHA Caja 3/ Exp. 0038.

constructions" due to "the flooding …over a large surface" caused by "damming the waters."[73] The Commission used a formula for land valuation developed by the Department of Agriculture and Forestry, and agreed to pay C. Lucio Domicio of Soyaltepec, Oaxaca, a total sum of $238.28 pesos for lands that were deemed "*terranos rusticos*." According to Commission policies, claims the amounted to less the $1000.00 pesos could be paid out without additional review or revisions.[74]

Other small land holders, "*pequeno[s] propeitario[s]*," successfully met the government's requirements for indemnification. Jose Vincente received a total of $13,590 pesos for his "*terranos rusticos*," his housing constructions, and his fruit trees, while Sra. Flora Martin of Soyaltepec, Oaxaca enlisted the aid of the local agrarian association and the municipal president to secure $1907.44 pesos to pay for her lost fruit trees.[75] By 1961, however, the Papaloapan Commission refused to entertain further petitions and published a list of the remaining individuals from the towns of Ixcatlan, Ojitlan, and Chicolchotla who would be eligible for compensation.[76] Not all petitioners sought government indemnification for displacement and hardship, however. Some wanted to take advantage of the economic opportunities promised by the Papaloapan projects. In addition to job seekers looking to work on construction projects, other groups sought official authorization to establish "new population centers"

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[73] *Acta Indemnizacion* DL – 177/966, AHA Caja 14/ Exp. 0183

[74] Correspondence: Enrique Lopez Vieyra to the Papaloapan Commission, 25 July 1966, AHA Caja 14/ Exp. 0138.

[75] Correspondence: Ramón Arteaga P. to Comision del Papaloapan, Departamento de Tierras, 13 October 1958, AHA Caja 61/ Exp. 165; Correspondence: Association Agricola de Raya del Soyaltepec, Ojitlan, Oaxaca to Comision del Papaloapan, Depatamento de Tierras, 17 October 1957, AHA Caja 61/Exp. 760, Correspondence: Venancio Ramos Alejandro to Comission del Papaloapan, Departemento Legal, 23 August 1960, AHA Caja 61/Exp. 760.

[76] Comission Del Papaloapan, Legal Department, 12 January 1961, AHA Caja 61/ Exp. 765.

in areas opened to irrigation agriculture.[77] Jose Carrasco, for example, sought presidential permission to establish an agricultural colony in the lower Papaloapan Basin. He and his constituents offered to pay $200 pesos per hectare using the proceeds from their agricultural yields over a ten year period.[78]

In the late 1950s, the Papaloapan Commission took stock of all of its achievements during its first ten years. An internal report entitled, *The Growth of the Economy of Papaloapan and Its Significance for the National Economy,* triumphantly proclaimed increases in agricultural and industrial productions, as well as improvements to infrastructure and hydroelectricity facilities.[79] According to Commission figures, there had been thirty-one hydroelectric plants in 1947 and a total of 162 plants in 1958, a 423 percent increase. The total capacity of hydroelectric power increased 86 percent from 57,557 kilowatts (KW) in 1947 to 93,450 kilowatts (KW) in 1958. Such increases in electronic energy productivity came at a cost of $80.8 million pesos, which amounted to 13.5 % of the Papaloapan Commission's total investment in its first decade. The construction of hydraulic works, by contrast, cost $239 million pesos and accounted for forty percent of the Commission's expenditures. Of that, approximately $171 million pesos were allocated to the Miguel Alemán dam. The Commission also devoted significant resources to promoting industrial development, allocated $200.5 million pesos for constructing factories and purchasing industrial equipment. Together, the

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[77] *Diario Oficial: Organo del Gobeirno Constitucional de los Estados Unidos Mexicanos,* 29 December 1965, 8, AHA Caja 24/Exp. 276.

[78] Correspondence: Jose Carrasco to Miguel Alemán, 7 January 1952, AGN MAV 315/ 32209

[79] Comision del Papaloapan, *El Crecimiento de la Economia del Papaloapan y su Significacción en la Economia Nacional,* AHA Caja 11/Exp. 0152. All figures in this section come from this internal Commission report

construction of hydraulic works, hydroelectric plants, and the promotion of industry amounted to 77 percent of the Commission's total investment. By contrast, officials only spent 9.1 percent of the resources on the social projects that would be at the center of public relations campaigns (this category included urban water and sewage facilities, education and schools, and urban electrification projects).

Promoting agriculture and opening new lands to production cost the Commission $42.1 million pesos in its first decade. That amounted to only seven percent of total investment, yet increasing agricultural production may have been the most significant achievement in terms of the national economy. According to the report, the Papaloapan Basin contained 2.8 million hectares of land under cultivation, representing 7.6 percent of the total land under cultivation for the nation as a whole. Within the basin, Oaxaca contained 60, 200 hectares of cultivated land in 1947, though that figured had climbed to 95,100 hectares by 1957, an increase of 58 percent. The amount of cultivated land in Veracruz increased from 147,800 hectares in 1947 to 287,800 hectares in 1957, a 94 percent increase. The southern portion of the state of Puebla which lies within the Papaloapan Basin saw a modest 20.7 percent increase in cultivated land

In Oaxaca, the number of hectares devoted to rice production increased 193.3 percent from 1,500 hectares in 1947 to 4,400 in 1957. Coffee production increased 71.3 percent from 10,000 hectares in 1947 to 17,300 in 1957. The production of sugar expanded from 2,500 to 6,300 hectares, a 142.3 percent increase. The production of staple crops like beans and corn expanded more modestly, however. Beans had been grown on 7,200 hectares in 1947, while corn production occupied 37,400 hectares. By 1957, the amount of land devoted to staple food production had increase only 25

percent for beans and 39 percent for corn, though the production of corn continued to consume the largest total acreage, with 52,000 hectares devoted to the crop in the state of Oaxaca by 1957.

According to Commission statistics, the increase in land under cultivation led directly to significant increases in total production and increases in the value of production. In Oaxaca, farmers produced 2,200 tons of rice in 1947 and 8,000 tons by 1957. Commission economists calculated that, assuming a median price of $530 pesos/ton, the increase in productivity amounted to a total of $4,240,000 pesos, a 263.6 percent increase in value. The production of high-value coffee crops ($7010 pesos/ton) increased from 3,900 tons in 1947 to 7,600 tons in 1957, from a value of $22,339,000 pesos to $53,276,000 pesos (a 94.9 percent increase). The production and value of food staples rose less dramatically, and even declined in the case of beans. In 1947, the state of Oaxaca produced 30,000 tons of beans, by 1957 farmers in the region produced only 25,000 annually. At median price of $980 pesos/ton, that amount to a 16.7 percent decline in the value of bean production. Corn production rose from 27,200 tons to 42,600 tons. With an average price of $552 pesos/ton, the value of corn production in Oaxaca rose from $15,014,000 pesos to $23,515,000 pesos, an increase of 56.6 percent. The total value of all agricultural production in Oaxaca increased 84.9 percent, from $52,250,000 to $96,633,000 pesos. However, the farmers of the state of Veracruz received an even greater boon from the activities of the Papaloapan Commission. Overall, the value of agricultural production in the Gulf Coast state increased 104.1 percent, from $157,507,000 pesos to $321,944,000 pesos. For the Papaloapan Basin as a whole, values rose from $232, 570,000 pesos to $451,231,000

pesos, a 94 percent increase. The lower basin in Veracruz also received the largest proportion of the hydroelectricity generated by the works of Papaloapan Commission, 91,039 kilowatts in 1957. Compared to the nation as a whole, Oaxaca declined from 3.7 percent to 3.4 percent of the Mexico's agriculture production, while production in Veracruz increased from 8.4 percent to 13.8 percent of the national total.

These statistics are highly politicized and significant for three reasons. First, by providing aggregate totals for the basin as a whole, and for the large segments of state territory within the basin, Commission officials could claim success. They could point to increases in commercial crops, such as rice and sugar, along the river banks protected from flood waters, while disguising localized failures in other parts of the basin. While flood control efforts may have made new lowland territories in Veracruz safe for commercial investment, those areas in which the state intervened most heavily struggled to meet expectations. The colonization schemes in Las Naranjas were abandoned as the modern agricultural techniques promoted by Commission planners failed to provide the Mazatec settlers with enough productivity to meet their debt obligations.

Secondly, the statistics challenge the state's own metric for success. The Papaloapan projects represented part of an effort to increase food production throughout the Republic, using scientific techniques developed in collaboration with the Rockefeller Foundation. The Foundation focused much of its attention on developing high-yield hybrid seeds for corn, wheat, and beans. However, the hybrid seeds required large quantities of irrigated water, which the Commission failed to provide after its hydraulic pumps became corroded. And the Rockefeller Foundation scientists had

never applied their modern agricultural techniques to tropical, rather than temperate climates and soils. As the statistics indicate, production in corn rose only modestly, while production in beans declined, as total food production in the indigenous highlands of Oaxaca declined in relation to production throughout the nation. Furthermore, the Commission largely neglected the public works and social projects in the Oaxacan highlands as the majority of its expenditures were devoted to large scale construction projects to benefit commercial farmers and cattle ranchers in lowland Veracruz. Displaced Mazatec Indians were left with little option other than asserting their rights by securing the best indemnification settlement they could get.

Finally, we should approach the statistics skeptically, as the Papaloapan Commission was under pressure to demonstrate success as it faced competition for resources from other government agencies. Despite the Papaloapan Commission's triumphant report, the projects were largely in decline during the late 1950s and early 1960s. By the late 1950s, the agricultural colonization schemes in the lower basin had failed and the goals of managing the natural world to promote conservation as well as development had been sacrificed to the needs of cattle ranchers and agro-business. Additionally, the fortunes of the Papaloapan Commissions were vulnerable to the vicissitudes of presidential administrations that did not share the enthusiasm that Miguel Alemán had originally expressed for the Papaloapan projects.[80]

Following the heyday of the Alemán presidency, subsequent administrations largely abandoned plans for grand public works schemes until the 1970s. Adolfo Ruiz Cortines focused on opening virgin lands to agricultural development and on expanding

[80] Of course, one could cynically argue that the projects represented little more than patronage to Miguel Alemán's supporters in Veracruz.

education and sanitary projects. However, when the Papaloapan Commission's energetic *Vocal Ejecutivo,* Raul Sandoval Landázuri, died in a plane crash in November 1956, much of the passion for new development dissipated. After the death of Sandoval, the Papaloapan Commission faced bureaucratic competition as other agencies sought access to federal funds by challenging the oversight of the Commission and asserted more fragmented, decentralized development projects. Lopez Mateos expressed little interest in the Papaloapan region as he shifted national priorities to the north and north pacific. He initiated budget and staff cuts, though he continued to supply funding for scientific research in the region. The subsequent president, Adolfo Lopez Mateos also shifted responsibility for road construction to Ministry of Public Works. During his tenure as president, Gustavo Diaz Ordaz commissioned few new programs, but he supported plans for rural development projects to develop the upper basin, to modernize the backwards Indians of the Oaxacan highlands.[81]

Paradoxically, despite the declining interest in the large-scale Papaloapan projects in the 1960s, development plans multiplied. According to one historian, "these different programs had at least one shared characteristic: they were all guided by the idea that Oaxaca was backward because its natives were conservative, lacked initiative, and continued to use rudimentary technology." Various government agencies, including SARH (Secretariat of Agriculture and Hydraulic Resources), INI (National Indigenous Institute), committed to bringing the indigenous groups of highland Oaxaca into the modern nation by introducing the modern technologies of the so-called Green

[81] Scherr and Poleman, *Development and Equity in Tropical Mexico,* 37-42; Poleman, *The Papaloapan Project,* 103-110.

Revolution. Technologies such as chemical fertilizers and improved hybrid seeds developed through collaboration between the Mexican government and the Rockefeller Foundation aimed not only to improve crop yields, they aimed to reshape the Mexican peasantry. "Yet, after years of work and millions of pesos invested, Oaxaca still lagged far behind the rest of the country."[82]

Conclusion

During the early years of the Papaloapan projects, the Mexican state attempted to assert control over both tropical nature and tropical peoples. State planners attempted to bring the tropical environment into the national economy, and they attempted to bring the Mazatec Indians of the Oaxacan highlands into modernity. State officials believed that the Papaloapan Basin held endless potential, if only its dangers could be avoided and its resources harnessed by scientific planners. They distrusted "backward" indigenous knowledge and tried to create commercial agricultural colonies using modern techniques and technologies. Visions of "the tropics" tempted state bureaucrats to extend their reach into distant corners of the nation. Though most of the early Papaloapan projects failed, state planners were seldom deterred from "modernizing" Mexican agriculture.

Declining budgets, inter-governmental squabbling, and a lack of local flexibility doomed the Papaloapan Commission's utopian plans for resettling the Mazatecas displaced by the Miguel Alemán dam and stripped the lower basin of the dense foliage that kept the thin soils in place, threatening the most ambitious commercial agricultural

[82] María de los Angeles Romero Frizzi, "The Indigenous Population of Oaxaca from the Sixteenth Century to the Present," Richard E.W. Adams and Murdo MacLeod, eds., *The Cambridge History of the Native Peoples of the Americas: Volume II, Mesoamerica, Part 2*, (Cambridge: Cambridge University Press, 2000), 336.

schemes and leaving the region barren, suitable only for cattle ranching. However, Government planners and agriculture scientists continued to see in the Papaloapan Basin an opportunity to test the applicability of theories for development in the tropical world and for fostering the transformation of indigenous folk culture into a rationally-planned, scientifically-informed modern agricultural utopia. The following chapter examines the academics who worked closely with the Papaloapan Commission to make complex reality legible for policy-makers. Economists and anthropologists discursively constructed the Papalaopan Basin and its inhabitants as an imagined world that conformed to the tropes of disciplinary models and obscured attempts to articulate alternate ways of living in tropical nature.

CHAPTER 4
A JUMP OF CENTURIES … IN JUST FOUR DAYS

This chapter examines the work of scientists and scholars that both justified intervention in the region, and simultaneously facilitated the specific *forms* that state development projects took. It reads the work of economists and anthropologists for the underlying assumptions that motivated scholarly interest in the region. Like state officials, scholars were informed by a discourse of "the tropics" that demanded intervention to bring intractable tropical environments into production, and to transform backward tropical peasants into modern commercial farmers. This chapter also explores how scholars simplified complex realities in order to construct puzzles that could be solved using the conventions of their respective academic disciplines. From the inception of the Papaloapan Commission in the late 1940s, economists from Mexico City and the United States poured into the basin to catalogue the flora and fauna in order to determine which natural resources presented the best opportunities for economic development. In addition, anthropologists under the guidance of the *Instituto Nacional Indigenista* (INI) took a new interest in the indigenous groups of Oaxaca, particularly the Mazatecas and Chinantecas of the upper Papaloapan Basin. Ethnographers were interested in examining indigenous culture in order to describe, and explicitly to *facilitate*, the decline of traditional folkways and the transition to modernity. The project of mapping and studying the Papaloapan Basin linked the Mexican government's concerns with flood control to a more ambitious effort to reshape Mexican agricultural development according to scientific dictates and modern methods. The rigidity of scientific assumptions silenced voices that may have expressed alternative ways of imaging the relationship with the natural world.

Legibility and Economic Development

During the 1950s, the tropical region became one of the most studied areas in Mexico. Researchers associated with the Papaloapan Commission and the National University (UNAM) flooded into the basin, mapping and cataloguing the flora and fauna. They made tropical nature legible and constructed forms of knowledge that would be usable for policy makers, economic planners, and engineers. Yet, their work coincided with the changes caused by the public work projects of the Papaloapan Commission. They were studying an ecosystem already in flux, and a society already in transition. For researchers studying the basin, their project involved chronicling, and championing, the "modernizing" work of the Mexican state, while the products of their labors provided the raw data for further government encroachments.

James Scott defines such state encroachments as "high modernist" development. High modernism is "a strong … muscle bound, version of … self confidence about scientific and technical progress, the expansion of production, the growing satisfaction of human needs, the mastery of nature (including human nature), and above all, the rational design of social order commensurate with the scientific understanding of natural laws."[1] For Scott, state high modernism may involve urban planning to remake cities in order to symbolically project the authority of the state and to demolish the unpredictable labyrinth of neighborhoods that foster and hide sedition and rebellion. Or, state high modernist projects often involved the "radical simplification" of nature to serve the needs of commercial forestry or commercial agriculture.[2] In order to

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[1] James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed,* (New Haven: Yale University Press, 1998), 4.

[2] Scott, *Seeing Like a State,* 262.

reorganize nature's flora and fauna to suit human needs, policy makers "translated" the natural world into a common standard that represented "only that slice [of the world] that interested the official observer." According to Scott, "legibility," thus, became "the central problem in [modern] statecraft."[3] But, he contends that state high modernist projects fail repeatedly, often tragically, because they excluded and disdained the flexibility of improvised local knowledge.[4]

Following Scott and others, in the present study, I do not present a blanket critique of state bureaucracy or scientific methods. I also do not uncritically celebrate "local knowledge." Rather, I attempt to elucidate the "'*imperialism*' of state interventions and the hegemonic planning mentality" that guided government planners and engineers of the Papaloapan Commission.[5] However, and unlike Scott, in this study I am primarily concerned with explaining the failure of the state developmental schemes in the Papaloapan Basin. Instead, in the following chapter I describe the assumptions that informed academic studies conducted by economists and anthropologists. Scott serves as a useful guide to understanding how the construction of knowledge often conformed to high modernist ideologies, and buttressed the authority of the state as the Papaloapan Commission extended its reach into the tropics of Oaxaca and Veracruz. Yet, merely explaining the failure of Mexican state develomentalism is a rather unsatisfying endeavor, particularly since such high modernist faith in scientific, rational planning survived the obvious failures of the 1950s and 1960s and continued to

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[3] Scott, *Seeing Like a State,* 2-3.

[4] Scott uses the classical Greek term "mētis" to denote knowledge that can only come from practical experience, compared to "the abstract knowledge deployed by the state and its technicians." See Scott, *Seeing Like a State,* 311.

[5] Scott, *Seeing Like a State,* 6. [italics in original]

influence both state planners and scientific experts in agronomy well into the 1970s and 1980s. Instead, examining the connections between academic research and state development allows us to discern the priorities of the mid twentieth century PRIista state and how its failures provided fodder for the genesis of new forms of political discourse centered on constructed understandings of indigenous environmental stewardship.

Studies of the Papaloapan Basin invariably followed patterns and maintained recognizable narrative forms. Scholars often began by describing the Papaloapan Basin in aggregate terms, focusing on "the land," "the natural world," and "the people." All researchers benefitted from collaboration with the Papaloapan Commission and often addressed their inquiries toward those issues of most interest to the Commission and to commercial developers. Both Mexican and American scholars worked closely with the Papaloapan Commission. Mexican planners and economists, most notably José Noriega and Jose Attolini, provided the most direct assistance in conceptualizing the basin as an integrated whole and developing an overall plan for expanding commercial opportunities.[6] American economists, by contrast, looked to Papaloapan for a model of development that could be applied elsewhere in the tropical world. The community of economists that took an interest in development in the Papaloapan Basin included three generations of American economists directed by Thomas T. Poleman of Cornell University. Poleman conducted his own research, in collaboration with the Papaloapan Commission, during the 1950s, and he guided doctoral dissertations by two of his students while he focused his attention on the problem of increasing agricultural

[6] José Noriega, "Control del río Papaloapan: Preparación del plan de estudios definitivos y programa de construcción de las obras," *Ingeniera hidráulica en Mexico*, I, (April- June 1947, July-September 1947); Jose Attolini, *Economia de la cuenca del Papaloapan,* (Mexico City: Instituto de Investiganciones Economicas, 1949).

productivity to combat hunger throughout the developing (tropical) world. In many ways, Poleman's priorities mirrored those of agronomists with the Rockefeller Foundation who focused on the narrowly defined scientific puzzle of increasing agricultural production.[7] The project of mapping and studying the Papaloapan Basin linked the Mexican government's concerns with flood control to a more ambitious effort to reshape Mexican agricultural development according to scientific dictates and modern methods.

The first major studies of the Papaloapan Basin dealt directly with the issue of flooding in the Lower Papaloapan Basin. Responding to mandates from Mexican President Miguel Alemán and his Minister of Hydraulic Resources, José Noriega surveyed the causes of floods in the most prominent cases on historical record and he outlined an ambitious program for the construction of flood control projects. His recommendations would form the basis for the Papaloapan Commission's plans for building the Miguel Alemán dam and the irrigation works in the Lower Papaloapan Basin. Noriega concluded the high incidence of flooding was the result of both man-made and natural causes. Due to both natural erosion and to deforestation, siltation caused the banks of the Papaloapan River to rise above the surrounding flood-plain. When heavy rains caused the river waters to overflow their banks, water rushed *downhill* and pooled in the surrounding lands, flooding towns and villages.

[7] See Thomas T. Poleman, *The Food Economies of Urban Middle Africa: The Case of Ghana,* (Stanford: Food Research Institute, Stanford University, 1961); Thomas T. Poleman, *The New Economics of India's Green Revolution: Income and Employment Diffusion in Uttar Pradesh,* (Ithaca, N.Y.: Cornell University Press, 1993); Thomas T. Poleman, "Global Hunger: The Methodologies Underlying the Official Estimates," *WP97-14,* (Ithaca, N.Y.: Cornell University, Department of Agricultural, Resource, and Managerial Economics, 1997).

The Alemán administration and the Papaloapan Commission were concerned with more than simply controlling flood waters. They sought to completely transform the Papaloapan Basin into a productive part of the national economy. To develop a comprehensive development plan, however, Commission officials need to make the flora and fauna of the region legible so that they could try to maximize opportunities for economic development. In 1949, Mexican economist Jose Attolini from UNAM published a two volume survey of the region's resources and he outlined a long-term plan for economic development. Attolini closely followed the goals of the Alemán administration and he declared that his study would be "of immediate interest to the authorities of the … Papaloapan Commission," in that it "contributed to the knowledge of the riches and the possibilities of Mexico."[8]

Like the Commission officials, Attolini echoed the tropes of a tropical discourse that maintained notions of an abundant but underutilized tropical environment. He explicitly declared that his study was not merely in the interest of pure science (whatever that might be), but he intended the knowledge to be applied to the practical development of the Papaloapan Basin. In clarifying his objectives and the objectives of the Alemán administration and the Papaloapan Commission, Attolini declared that he had seven distinct goals. First, he hoped his studies would help control flood waters. Second, he wanted to make the Papaloapan Basin a healthier region (*zona salubre*). For state-sponsored scholars, tropical nature was potentially productive but also dangerous as tropical diseases like yellow fever and malaria had historically limited efforts to develop tropical regions. Many of the earliest efforts by governments and non-

[8] José Attolini, *Economia de la Cuenca Papaloapan: Agricultura,* vol. 2 (Mexico City: Insituto de Investigaciones Economicas, 1949) 7.

governmental organizations to settle tropical areas in Mexico and Latin America focused on public health campaigns and the eradication of tropical diseases.[9] The Papaloapan Commission also tried to address public health concerns to justify intervention into remote rural areas.[10]

Attolini continued, declaring that his third goal was to promote agricultural development in inundated zones that would be drained by the public works projects, and irrigated agriculture in drier areas. Furthermore, as their fourth goal, he and the Papaloapan Commission wanted to generate hydroelectricity to facilitate industrial development in the region. Fifth, the economist wanted industrialization to lead to the creation of new centers of population. Aesthetically, he wanted to make the rivers more navigable, and more beautiful. Finally, Attolini and the Commission devised a plan to construct a modern communications network across the Papaloapan Basin.[11] Attolini's objectives established the template for future studies of the region. The American economists that followed from the 1950s through the 1980s examined the Papaloapan projects in order to describe a model of tropical development that could be applied in other parts of the tropical world. As such, they were primarily concerned with what James Scott identified as the "radical simplification" of the natural world in order to highlight only those factors that could be useful for promoting tropical development.

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[9] For example, see a recent book on the Rockefeller Foundation's public health campaigns, Steven Palmer, *Launching Global Health: The Caribbean Odyssey of the Rockefeller Foundation,* (Ann Arbor: University of Michigan Press, 2010).

[10] W.W. Winnie, "The Lower Papaloapan Basin: Land and People," Doctoral Dissertation, University of Florida, 1956, 105-120.

[11] Attolini, *Ecomomia de la Cuenca Papaloapan,* 5-6.

The basin lies directly west of the Isthmus of Tehuantepec, covers 17,800 square miles and incorporates portions of three Mexican states: Oaxaca, Puebla, and Veracruz.[12] The region lies entirely within the tropics of the Northern Hemisphere. As in other parts of Latin America, however, the climate and vegetation vary dramatically according to altitude and proximity to the rich soils of the alluvial flood plains. To make such a complex natural world legible to planners, scholars simplified and classified various parts of the Papaloapan Basin into five separate subsections according to criteria that defined their utility for economic development. They devised an artificial construct and designated the five subsections as 1. the industrial region, 2. the lowlands region. 3. the Tuxlas 4. the colonization region and 5. the Oaxacan highlands.[13] The first subsection, an "industrial region" was centered on the cities of the northwest corner of the basin closest to Puebla and the Central Valley. The cities of Cordoba, Orizaba, Ciudad Mendoza, and Tehuacan were more integrated into the national economy than the rest of the basin, and they followed a pattern of industrial development distinct from the rest of the basin. The Industrial Region form part of the urbanizing route that linked the ports of Veracruz to Puebla and Mexico City, and industrialization began early as Mexico's first railroad passed through and entrepreneurs established textile industries and breweries during the first half of the twentieth century.[14]

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[12] Thomas T. Poleman, *The Papaloapan Project: Agricultural Development in the Mexican Tropics,* (Stanford: Stanford University Press 1964), 31.

[13] Poleman, *The Papaloapan Project;* Sara J.Scherr, and Thomas T. Poleman, *Development and Equity in Tropical Mexico: Thirty Years of the Papaloapan Project,* (Ithaca, NY: Cornell University, Department of Agricultural Economics, 1983), 25-34; Winnie, "The Lower Papaloapan Basin," 5-61. It seems that economics, like history, is often a discipline concerned first with "naming" as a way of structuring forms of knowledge. See Jacques Rancière, *The Names of History: On the Poetics of Knowledge,* forward by Hayden White, trans. Hassan Melehy, (Minneapolis: University of Minnesota Press, 1994).

[14] Scherr and Poleman, *Development and Equity in Tropical Mexico,* 25-29.

Scholars defined a second “lowlands region” as the next subsection. Researchers focused most of their attention on the Lower Papaloapan Valley that benefitted most directly from the interventions of the Papaloapan Commission.[15] Most of the flood control and irrigation works were aimed at increasing agricultural productivity in the lower Papaloapan Basin and integrating the region into national markets. However, many of the agricultural projects neglected to account for the poor fertility of tropical soils. Clearing the virgin forests revealed thin soils that could not maintain high levels of production. In addition, high velocity winds battered the coastal plains and damaged stalks of corn and wheat. Though, commercial rice production accelerated along the irrigated floodplains, and fruit trees, especially pineapples flourished around Loma Bonita. Most of the lowlands, however, were covered by open savannah lands and pasture for cattle ranching. Perhaps an unintended consequence, the expansion of cattle ranching proved to be the most direct consequence of the Papaloapan Commission’s interventions. And, as we will see in the next chapter, even agricultural research and experimentation shifted from a focus on increasing human food supplies to the less intractable challenges of producing cattle feed in the tropical lowlands.

Also along the coastal plains of the Lowlands Region, oil production accelerated around the burgeoning industrial cities of Cosamaloapan and Tierra Blanca. Oil transformed the ecology of the region and caused officials to change course, giving the state-run oil company, PEMEX, greater authority and challenging the jurisdiction of the Papaloapan Commission to develop the basin as an integrated whole. By 1970, nine

[15] Scherr and Poleman, *Development and Equity in Tropical Mexico,* 29; Poleman, *The Papaloapan Project;* Winnie, “The Lower Papaloapan Basin.”

wells pumped 467,000 barrels of crude oil, 12,000 barrels of condensed oil, and 393 cubic meters for natural gas.[16]

W.W. Winnie, one of the few American scholars not affiliated with Thomas Poleman or Cornell University, focused his research entirely on the Lowlands Region. He contributed a more comprehensive overview of life in the Lower Papaloapan Basin. He collected information from the Mexican Census of 1950 and the Papaloapan Commission to construct some of the first maps of the region, and he goes further than other scholars in examining the human population of the Lowlands. He provided an extensive description of settlement patterns and chronicled the changes that accompanied the Papaloapan Commission's resettlement of displaced Mazatec Indians and the general commercialization of agriculture in the basin. Yet, Winnie applauded the efforts of the Papaloapan Commission and shared with his Mexican and American colleagues a sense that the tropical regions of Mexico should be developed and that tropical peoples could become part of modern national markets. He declared that his study implicitly promoted "the hypothesis that the Lower Papaloapan Basin, and therefore similar tropical lowland regions throughout the world, are capable of being developed, that is, there is nothing about the physical environment [or the people] of such regions," which prevented economic development and "a moderately dense population with good levels of living."[17]

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[16] Mexico, Secretaría de recursos hidrualicos, Comisión del Papaloapan, *Diagnostico socio-economico del cuenca,* 1973; Scherr and Poleman, *Development and Equity,* 29; for a discussion of the ways in which altered the ecology of the lowlands of northern Veracruz, see Myrna Santiago, *The Ecology of Oil: Environment, Labor and the Mexican Revolution,1900-1938*, (New York: Cambridge University Press, 2006).

[17] Winnie, "The Lower Papaloapan Basin," 342.

In the southeast corner of the Papaloapan Basin, the Sierra de los Tuxlas rise to form the third geographical zone. The Tuxlas which reach altitudes of 3000 meters once belonged to Hernan Cortes's *encomienda*. By the early 1970s, the two towns of San Andres Tuxla and Acayucan had 30,000 inhabitants each and became industrial centers for tobacco and soft drink processing. The mountains in the northern section of the Tuxlas had been formed by volcanic activity and had rich soils, but the remainder of the region was marked by poor soils, and flood-prone mountain valleys.

The central part of the Papaloapan Basin remained sparsely inhabited until the Papaloapan Commission began resettling displaced indigenous peoples to areas south of the city of Tuxtepec, Valle Nacional, Las Naranjas, and Playa Vicente. In the "colonization region," the Papalaoapan Commission tried to resettle Zapotec, Chinantec and Mazatec Indians and attempted to construct two roads from Tuxtepec in order to open the region for the livestock industry. The Commission had not completed either of the roads by 1970 and colonists largely abandoned the new colonies within a few years. Two decades later, the "colonization region" could boast no towns with more than 5000 inhabitants and the Papaolapan Commission would attempt to resettle Mazatec Indians displaced by the construction of a new dam, the Cerro de Oro Dam, to the distant Uxpanapa Valley in the Isthmus of Tehuantepec, well beyond the southern borders of the orginal colonization zone.[18]

The resettlement schemes in the colonization region failed for a number of reasons. As noted in the previous chapter, the indigenous colonists funded their agricultural endeavors by contracting loans from the Papaloapan Commission. In

[18] Scherr and Poleman, *Development and Equity,* 31-32; Ewell and Poleman, *Uxpanpa: Agricultural Development in the Mexican Tropics,* (New York: Pergamon Press, 1980), 1-12.

exchange, they submitted to the guidance and were forced to follow procedures proscribed by agronomists and agricultural scientists. In the next chapter, we will discuss how such agricultural experts attempted to apply knowledge constructed in experimental stations in more fertile, temperate regions to practical problems in the tropical south. Commission officials and agronomists prevented the indigenous colonists from improvising local solutions to problems of erosion and poor soil fertility because they deemed local land use practices to be backwards and primitive. In the Colonization Region, however, the new agricultural technologies that would later be associated with the so-called "Green Revolution" could not overcome the limits imposed by the tropical environment.

The colonization region received the most rainfall of any of the subregions of the basin. Moisture-laden air rose to climb the steep slopes of the Sierra Madres. Precipitation increased as the air cooled, flooding the eastern piedmont and leaving an orographic rain shadow in the Oaxacan highlands. Furthermore, the region lies directly in the path of Gulf hurricanes that cause much of the flooding that has vexed and continues to vex, Mexican government officials.[19] Heavy rainfall also washed away the soils and exposed acidic soils and rocky terrain. At lower altitudes, the region proved suitable only for cattle ranching, while some commercial coffee production was established on steeper slopes. However, few displaced indigenous colonists could thrive in the region since the soils were unsuitable for subsistence production of such

[19] The region suffered sever flooding again in September 2010 when Hurricane Karl hit the Mexican Coast. See Ken Ellingwood, "Karl Batters Mexico's Gulf Coast," *The Los Angeles Times,* 18 September 2010, 3A.

staple crops as corn and squash, even with the application of hybrid seeds, and chemical fertilizers and pesticides.

American economists devoted less attention to the Chinantec and Mazatec homelands in the Oaxacan highlands, perhaps because the region was "one of the most backwards areas in Mexico."[20] The highlands held few opportunities for commercial agricultural development due to a lack of rain and rugged terrain, and the high altitude valleys along the Rio Tonto River were flooded by the Miguel Alemán dam. In addition, scholars blamed local land use practices for depleting natural resources. They charged indigenous peoples with overusing forest resources, as firewood provided the main source of cooking and heating fuel. They also charged that "overgrazing and poor agricultural practices have led to severe erosion."[21] The population of the Oaxacan Highlands remained overwhelmingly indigenous and there was relatively little commercial activity beyond livestock pasturage and subsistence agriculture on communally held *ejidos*, though some small basket weaving and handicraft industries had developed around the Mixtec villages in the south and small-scale coffee production thrived around the town of Huautla de Jimenez.

The Oaxacan Highlands had been home to numerous indigenous groups. Mixes, Zapotecas, Mixtecas, Mazatecas, Cuicatecas, Popolocas, and Mexica-Nauhuas, and Chinantecas contributed to a region that has "greater diversity than anywhere else in Mexico, except possibly the Yucatan Penninsula."[22] Oaxaca remains the "most indigenous" Mexican state and indigenous groups continue to mobilize around a sense

[20] Scherr and Poleman, *Development and Equity,* 32.

[21] Scherr and Poleman, *Development and Equity,* 33.

[22] Scherr and Poleman, *Development and Equity,* 33-34.

of ethnic solidarity.[23] Beginning with the construction of the Miguel Alemán dam, however, the highlands region began losing population. Younger generations left to seek work on the Papaloapan Commission's construction projects, or in the cities of Oaxaca, Puebla, or Mexico. The Papaloapan Commission explicitly encouraged the so-called "backwards" peoples to enter the national labor pool. Furthermore, the construction of the Miguel Alemán dam displaced Mazatec communities from their ancestral homelands and led to the utopian colonization schemes in the foothills of the eastern Sierra Madres.

American and Mexican economists enthusiastically followed the Mexican state into the tropics of the Papaloapan Basin. The goals of government officials and academic scholars were mutual constitutive and mutually reinforcing. Each believed that the region could be developed. By promoting commercial agricultural development coordinated by a centralized government agency, The Papaloapan Commission could finally conquer tropical nature and realize the promises of a tropical utopia. The tools of modern scholarship would provide the plans and the means for realizing the dreams of state planners. Scholars made tropical nature legible, and cut a path through the dense tangled tropical forests. Scholars and government officials envisioned a complete transformation, with commercial production of lucrative cash crops like sugar, coffee, and trees fruits supplemented by new colonization programs directed by agricultural scientists employing the most modern technologies, like the hybrid seeds, pesticides

[23] See Howard Campbell, Alicia Barabas, Leigh Binford, Miguel Bartolome, eds., *Zapotec Struggles: Histories, Politics, and Representations from Juchitan, Oaxaca,* (Washington: Smithsonian Institution Press, 1993).

and fertilizers that were simultaneously being developed in collaboration with the Rockefeller Foundation.

After three decades, however, the Papaloapan Basin had changed very little despite the construction of dams, public health facilities, roads, and communications networks. Certainly new agricultural enterprises benefitted from links to national markets. Rice production along alluvial flood plains and pineapple plantations around Loma Bonita thrived as roads connected formerly isolated territories. New industrial developed in the lower basin, though much if it was associated with the expansion of oil drilling rather than the comprehensive development plans of the Papaloapan Commission. For most the lower basin and the piedmont of the eastern Sierra Madres, however, much the land was suitable only for cattle ranching, and increasingly even the research into agricultural productivity focused on developing more prolific sources of animal feed. Despite high hopes for the rural colonization schemes around Las Naranjas or Playa Vicente, the government planners and scientific advisors never successfully deployed modern agricultural technologies and centralized planning to bring tropical nature and tropical peoples into the developmentalist national project. Though many of the Commission's colonies were abandoned by 1956, they did succeed in disrupting traditional indigenous communities and promoting a shift away from rural folk life.[24] Along with the economists who studied the potential for developing the

[24] In total 3000 displaced Mazatec families and 500 other colonists attempted to settle in the dense tropical forests of the colonization zone. They were offered plots of between 15-50 hectares in return for payments of 100 pesos per hectare and an individual assessment of 300 pesos per person for improvements already constructed by the Papaloapan Commission. The initial payments were financed through credit extended by the Commission. After a year of following the Commission's dictates, colonists became eligible for long-term credit up to $10,000 pesos for the construction of housing. See Winnie, "The Lower Papaloapan Basin," 334-335. Many colonists could not meet their debt obligations and were "left unprepared for the brusque suspension of services that frequently occurred" when the federal government diverted resources from the Papaloapan Commission. The colonists abandoned the colonies

resources of the basin, anthropologists soon appeared to chronicle and facilitate the transition of southern Mexico's Indians into the modern nation.

From Tribal Life to Civilized Life

The anthropological studies in the Papaloapan Basin were intimately connected to the Papaloapan Commission and were conducted under the supervision of Gonzalo Aguirre Beltrán, the head of the *Instituto Nacional Indigenista* (INI). The INI had been responsible for managing the agricultural colonization schemes in Las Naranjas in the early 1950s. Many of the initial ethnographic work was conducted in order facilitate resettlement of the Mazatec Indians displaced by the construction of the Miguel Alemán Dam. In later years, as the Commission suffered budget cuts and competition from other government agencies, the INI continued to conducted ethnographic studies in the region to determine the impact of displacement and modernization on indigenous peoples. In effect, ethnographers attempted to write "the anthropology of a dam."[25] Prior to the 1970s, anthropologists studying the basin fell into a tight intellectual genealogy that began with Robert Redfield's pioneering work on Tepoztlán and the Yucatán, and can be traced through the influence of Alfonso Villa Rojas and Aguirre Beltrán who focused their research more narrowly on the Papaloapan Basin.

One recent commentator credits Robert Redfield with reshaping the discipline of anthropology.[26] Redfield's conclusions inspired mid-twentieth-century anthropologists

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within two years, much of the land was left for cattle ranching, which increased 2 ½ times by 1970. See Sara J. Scherr and Thomas T. Poleman, *Development and Equity in Tropical Mexico: Thirty Years of the Papaloapan Project,* (Ithaca, NY: Cornell University, Department of Agricultural Economics, 1983), 60.

[25] David F. McMahon, *Antropologia de una presa: Los Mazatecos y el proyecto del Papaloapan,* (Mexico City: Instituto Nacional Indigenista, 1973).

[26] Clifford Wilcox, *Robert Redfield and The Development of American Anthropology,* (Lanham, MD: Lexington Books, 2004)

to return to the grand evolutionary theories that had fallen out of favor after Franz Boas and his followers attacked discredited models of scientific racism. Redfield avoided earlier racist assumptions but posited a theory of large-scale social change. He combined the generalizing scientific approach of sociology with the description of anthropology which led to the growth of peasant studies as a subfield of anthropology.[27] Redfield focused on peasants as "semicivilized" rather than "primitive" people and argued that peasants were not self-sufficient, culturally-consistent wholes. Instead, Redfield asserted that peasant communities maintained political, economic, social, and cultural links to regional and national centers of power and that they were undergoing a transition from village folk life to urban modernity.[28] Much of the discussion that follows will resonate to anthropologists familiar with debates over Mexican village studies. In the present context, this discussion is not intended as a comprehensive review of the anthropological literature. Instead, it describes the anthropological discourse and the intellectual and institutional genealogies that shaped the studies of the Papaloapan Basin.

In his seminal work, *Tepoztlan, A Mexican Village: A Study of Folk Life,* Redfield first articulated his interest in Mexican folk culture as it engaged with the forces of modernization. Studying a mountain village that is near Mexico City, but isolated by the sierras that encircle the capital and cut it off from the state of Morelos, Redfield tried to move away from elite political histories that dominated Mexican studies after the Revolution. Instead, he focused on what he called the "folk," people who maintained

[27] Wilcox, *Robert Redfield,* 2-3, such prominent American anthropologists as Oscar Lewis, Eric Wolf and Clifford Geertz followed Redfield's inspiration.

[28] Wilcox, *Robert Redfield,* 185.

folk songs and oral traditions as "the caretakers of a culture." The folk did not rely on the printed word and preserved continuity through generations while living in relatively homogeneous rural communities. Yet, Redfield noted that "Mexico is in no small part modern," and that increasingly residents in rural communities were "ceasing, or have already ceased, to be a folk people."[29]

Redfield was interested in chronicling that change from folk cultures to modern peasantries. Not concerned with investigating isolated indigenous peoples in order to "learn something about the Pre-Columbian cultures, and about the changes which they underwent when they came in contact with the Spaniards," or in "preserving the record of dying cultures," Redfield sought to study "what happens [in the present] rather than what happened [in the past]."[30] Redfield tried to describe "the general type of change whereby primitive man becomes civilized man, the rustic becomes the urbanite."[31]

For Tepoztlán, Redfield described a process in which changes emanated from the central plaza where the village welcomed visitors from outside the community, and first encountered such forces of cultural change as trade, machinery, and print media.[32] However, Redfield more fully developed his ideas about the transition from Indian folk communities to modern, *mestizo* cities and towns through his systematic study of the Yucatán Peninsula. With his work in the Yucatán, Redfield also began a long

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[29] Robert Redfield, *Tepoztlan, A Mexican Village: A Study of Folk Life,* (Chicago: University of Chicago Press, 1930), 1-3.

[30] Redfield, *Tepoztlan,* 12-13.

[31] Redfield, *Tepoztlan,* 14.

[32] Redfield, *Tepoztlan,* 217-223.

collaboration with Alfonso Villa Rojas, who would later conduct one of the major anthropological studies of the Papaloapan Basin for the Papaloapan Commission.

Alfonso Villa Rojas met Robert Redfield in 1930 while serving as the head of the local school in the village of Chan Kom. Together, the two conducted a systematic ethnography of Chan Kom and later expanded their findings in a more comprehensive, comparative study of the folk villages the Yucatán.[33] Redfield and Villa Rojas classified settlements in the Yucatán according to their degree of integration into the modern system of state governmental control, economic exploitation, and their use of modern print media rather than oral tradition. They plotted localities along a spectrum that ranged from primitive tribal settlements to peasant villages to cities and towns. Beginning with the study of Chan Kom, near Vallodolid in the eastern Yucatán, they focused their attention on the intermediate peasant villages. Chan Kom had been founded in the late nineteenth century by pioneers who cleared wilderness lands abandoned after the Yucatán Caste War of the 1840s. The community leaders made the conscious decision to welcome the social and political changes brought by the Mexican Revolution of 1910.[34] As such, Chan Kom served as an ideal model for researchers concerned with rapidly changing rural communities. Redfield and Villa Rojas defined such intermediate communities according to their economic and political dependence on larger "towns and cities of modern literate civilization," the recent

[33] Robert Redfield and Alfonso Villa Rojas, *Chan Kom: A Maya Village,* (Washington: Carnegie Institute of Washington, 1934), vii-viii; for the larger comparative study see Robert Redfield, *The Folk Culture of the Yucatan*, (Chicago: University of Chicago Press, 1941).

[34] Robert Redfield, *A Village That Chose Progress: Chan Kom Revisited,* (Chicago: University of Chicago Press, 1950), 2-3.

acceleration of change after the Mexican Revolution, and the self awareness of the "peasant [who] is a rustic, and … knows it."[35]

By 1946, Chan Kom had become the seat of its own municipal government. In addition to the school, the village had a municipal building, a stone prison building, a baseball diamond, two outdoor theaters, four stores, a masonry church and a Protestant chapel. For researchers like Redfield and Villa Rojas, Chan Kom became a laboratory that could provide important lessons for the Western world. The village was a place in which people strove to "set a goal, to make progress or self-advancement, to define that progress in terms of more material wealth, power, comfort and health, to strive for economic and political power in competition with one's neighbors – this is what most of us have been doing." Consequently, Redfield believed that Chan Kom "seems to tell us something about civilization."[36] Redfield favorably compared the settlers of the jungle of the Yucatán with the pioneers that established civilization in the wilderness of the American West. He exclaimed that "like the Europeans who colonized the United States, the settlers of Chan Kom came into a little-occupied territory of open resources; like them they were stimulated by ideas of liberty [and]… brought with them a system of religious institutions and moral ideas," that demonstrated a "Protestant [work] ethic before they ever heard of Protestantism."[37]

Chan Kom came to represent an ideal type of village and represented progress along a folk-urban continuum. Using the Yucatán Peninsula as a model, Redfield developed a more comprehensive understanding of cultural change by describing four

[35] Redfield and Villa Rojas, *Chan Kom,* 1-6.

[36] Redfield, *A Village That Chose Progress,* 24.

[37] Redfield, *A Village That Chose Progress,* 155-157.

cities or villages that were increasingly distant, in both cultural and geographical terms, from modern civilization, represented by the bustling regional capital of Merida and its surrounding henequen plantations. As Redfield moved further to the southeast from Merida, he described the transition from the more modern, urban, Spanish "civilization" to more "Mayan, archaic, and primitive" societies.[38] Redfield posited that the relative distance from modern cities on a map also corresponded to the relative cultural distance in which the cities were defined by "disorganization of culture, secularization, and individualization." By contrast, folk villages and tribal villages were defined by cultural homogeneity, superstition, and isolation.[39] Chan Kom represented the intermediate peasant village that was both linked to modernity, but maintained local traditions, despite rapid transformations.

Beyond theorizing and conceptualizing the cultural evolution toward modernity, Redfield and Villa Rojas actively facilitated or accelerated the transitions underway in villages like Chan Kom. The presence of Villa Rojas as a teacher from the regional city of Merida, helped transform the village through connections he created with the broader economic world of henequen and *chicle* production, and transnational connections to American researchers, like Redfield, associated with the Carnegie Institute's interest in the nearby archeological site at Chichén Itzá. According to Redfield, most of the community leaders supported reforms that brought public health facilities, roads, and support for the village school. The village "chose progress" in part because of the

[38] Redfield, *The Folk Culture of the Yucatan,* 13.

[39] Redfield, *The Folk Culture of the Yucatan,* 338-339.

"unusual sympathy and guidance the people have had from certain of their schoolteachers, [and] especially from [Alfonso Villa Rojas]."[40]

In his diary, Villa Rojas tells of taking village leaders to Merida, where he established them in the Hotel Colonial to await the spectacles of airplanes, ships, and the sea (in the nearby coastal town of Progresso). In Merida, Villa Rojas guided the contingent from Chan Kom as they engaged with the state and national governments. From the Governor of the Yucatán, the requested musical instruments in order to form a local orchestra, and they complained to Agrarian Commission that part of their *ejidal* grant following the Revolution included rocky and sterile lands. The Chan Kom village leaders saw two airplanes fly overhead, but "the appearance of these machines caused not the slightest impression," and "they were no more surprised" to see visions of the ships and the sea at Progresso.[41] Though, one villager, Roberto Nas, wondered "'how do the people live here if there is not any place for where they can make a *milpa* [maize field]?"[42]

Robert Redfield remains an important figure in the tradition of anthropology in Mexico, indeed in anthropology as a whole. He most directly influenced the work of Alfonso Villa Rojas, who later conducted an ethnographic study of the Mazatec Indians displaced by the construction of the Miguel Alemán dam. Redfield also influenced the thought and the work of Gonzalo Aguirre Beltrán As head of the *Instituto Nacional*

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[40] Redfield and Villa Rojas, *Chan Kom,* 6. Redfield revisited Chan Kom seventeen years later and chronicled his reunion with community leader D. Eustaquio Ceme in *A Village that Chose Progress*.

[41] Alfonso Villa Rojas, "A Chan Kom Diary," in Robert Redfield and Alfonso Villa Rojas, *Chan Kom: A Maya Village,* (Washington: Carnegie Institute of Washington, 1934), 236.

[42] Roberto Nas, quoted in Alfonso Villa Rojas, "A Chan Kom Diary," in Robert Redfield and Alfonso Villa Rojas, *Chan Kom: A Maya Village,* (Washington: Carnegie Institute of Washington, 1934), 236.

Indigenista (INI), Aguirre Beltrán attempted to use Mexican examples to develop a comprehensive theory of social change in developing countries, particularly those countries whose history was marked by colonial domination. Though he was influenced by Redfield's focus on indigenous societies in the process of transition resulting from increased contact with the modern industrial world, Aguirre Beltrán favored applied anthropology to facilitate, not simply to chronicle, social changes. In one of his later works directed toward policy makers, he stated that his "major goal is to foster the integration of the Indian into the nation" and to promote economic development in the tropical, backwards, and isolated regions of the country.[43]

According to Aguirre Beltrán's model, indigenous peoples of Mexico, and elsewhere, closed themselves off into "regions of refuge" as a result of their confrontations with the forces of colonial domination. They created a social structure divided sharply between a modern industrializing core and a traditional and archaic periphery that existed within a single national territory. Moreover, Aguirre Beltrán saw the process of domination (*proceso dominical)* as the direct cause of the evolutionary retardation of Indian communities. He lamented that in parts of Mexico one finds "the simplest and most conservative cultures of the continent, appearing to exist in unaltered states since the discovery of America … typified by the life styles of the jungle Indians who roam the hostile tropics" and are "so immersed in [their] natural environment that it is difficult to separate them from it. "[44]

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[43] Robert C. Hunt, "Introduction," in Gonzalo Aguirre Beltrán, *Regions of Refuge,* (Washington D.C., Society for Applied Anthropology, 1979).

[44] Gonzalo Aguirre Beltrán, *Regions of Refuge,* (Washington D.C., Society for Applied Anthropology, 1979), 11-23.

Aguirre Beltrán described the process of domination that led to this "dual social structure," at least at the local level. First, racial segregation, sanctioned by law, reinforced physical and spatial difference. Second, the dominant social group maintained political control by excluding the subordinated groups from full political participation. Often, cultural domination buttressed political control by denigrating native cultures and traditions. Third, colonial domination created a situation in which indigenous peoples became economically dependent as "the natives have no participation in the direct ownership of large-scale exploitative enterprises, nor in importation."[45] In other words, Indians could neither earn economic power as *hacendados* or merchants, and often served only as laborers in colonial economic system. Forth, the dominant group initiated a series of interventions, such as public health campaigns, ostensibly designed to protect the dominant group. In addition, since "knowledge is a powerful force," formal education was systematically withheld from the lower castes. In the fifth stage of Aguirre Beltrán's scheme, social distance was maintained by the norms and mores of a mature colonial system. Finally, spiritual missionaries circulated an ideology focused on rewards in the afterlife in order to "promote conformity and make subordination and abuse tolerable."[46]

For our purposes, it is unnecessary to determine whether or not this progression is historically accurate. It is more important to understand how Aguirre Beltrán and his followers drew upon such historical narratives to justify their own interventions into the rural, tropical areas of southern Mexico. Despite arguing that historical processes led to

[45] Aguirre Beltrán, *Regions of Refuge,* 16.

[46] Aguirre Beltran, *Regions of Refuge*, 17.

the domination of a modernizing industrial society, Aguirre Beltrán reflected precisely the values and assumptions of a modernizing, industrial society. For the anthropologist, the Indians remained backwards, archaic, isolated, and traditional. They needed to be brought into the modern nation. Though supposedly more paternalistic than his colonial predecessors, Aguirre Beltrán denied Mexico's indigenous peoples any autonomous historical agency; they were the objects of applied anthropology and they were expected to defer to the expertise of scientifically-trained experts.

Aguirre Beltrán's theory is confusing and, frankly, self-serving or at least serving the parallel interests of a modernizing developmentalist state. In his description of the process of domination, Aguirre Beltrán declares that "the problem[s] of ethnic minorities [are] located at the *regional* level." Indians were excluded from *regional* society and *regional* structures of political power. However, in contrast to "the attitude held by regional society, the *national* society encourages ethnic groups to arise and claim their rights. When minorities have a low technological culture incompatible with modern life, the national society promulgates protective laws [emphasis added]."[47] Therefore, Aguirre Beltrán and his followers promoted the integration of indigenous groups into the national society under the tutelage of social scientists as the solution to the problem racial domination.

At first glance, Aguirre Beltrán's argument appears grounded in careful scholarship. It was methodologically sophisticated and historically informed. For activists and critics on the Left, it denounced colonial domination and presented an urgent call to action. Yet, under closer scrutiny, this scientific, or at least scholarly,

[47] Aguirre Beltrán, *Regions of Refuge,* 18-19.

theory actually reflects the major tropes of the official narrative of the Mexican Revolution presented by the professional managers of the institutional revolutionary state. Just as the Revolution liberated the Mexican peasants from the exploitation of *hacendados* by breaking up large estates and redistributing lands as *ejidos,* the new professional managers of the institutional revolutionary government, the *tecnicos,* continued the legacy by rescuing Indians from regional domination by incorporating them into a developmentalist national vision. The narrative also followed the logic of Papaloapan Commission officials who attempted to transform backwards Indians into modern peasants.

The Papaloapan Commission supported research by anthropologists to make the culture of highland Indians legible to policy makers. The initial work was conducted by scholars from the *Instituto Nacional Indigenista* (INI), headed by Alfonso Caso and Gonzalo Aguirre Beltrán. Under the auspices of the INI, Alfonso Villa Rojas, Robert Redfield's former student and collaborator form Chan Kom, conducted the first major anthropological study of the indigenous groups resettled by the Papaloapan Commission.[48] Both Aguirre Beltrán and Redfield influenced Villa Rojas's study. Villa Rojas was attracted to the Papaloapan Basin since it presented an opportunity to study a society in transition. In 1948, assumed control of the Anthropology Section of the Papaloapan Commission and was later named the director of the Social Studies Department of the Papaloapan Commission. He arrived with a team of research assistants in 1949, after the work of the Papaloapan projects had already begun. His study was commissioned by the Papaloapan Commission and the INI in order to identify

[48] Alfonso Villa Rojas, *Los Mazatecos y el problema indgena de la cuenca del Paploapan,* (Mexico City: Instituto Nacional Indigenista, 1955).

“the problems confronting” the government agencies and to formulate a plan for addressing the “most urgent necessities with respect to education, health, land tenancy, economic resources, communication, livelihood, nutrition, and recreation,” for the resettled indigenous groups in the lower Papaloapan Basin.[49] The research team worked among the Popoluca established in Sayula, Veracruz, and the Chinanteca and Mazatecas from the highlands of Oaxaca. Villa Rojas concerned himself most with the Mazatec Indians from the municipalities around Soyaltepec who had been displaced by the construction of the Miguel Alemán dam.

After providing obligatory descriptions of “the land and the people,” Villa Rojas turned the focus of his study to the transformation of the “Mazatec World” that resulted from the works of the Papaloapan Commission. He calculated that twenty-one *ejidos,* home to approximately 20,000 people, received indemnification for a total of MP$ 4,850,195.28 to redress the loss of houses, land, and fruit trees, when the Miguel Alemán reservoir inundated the highland valleys and forced the Mazatec Indians to relocate to the colonization zone in the eastern piedmont.[50] According to Villa Rojas, “the necessity of transferring to another site the numerous populations that occupied the lands that have been covered by the waters of the dam constitutes the most complicated human problem now confronting the works of the Papaloapan [Commission].” For Villa Rojas, it was not merely a matter of a geographic move to a

[49] Villa Rojas, *Los Mazatecos,* 14.

[50] Villa Rojas, *Los Mazatecos*, 122-123; 133; According to the 1950 Mexican Census, the populations of the three municipalities flooded by the reservoir were, respectively, San Miguel Soyaltepec – 9,719, San Pedro Ixcatlán – 8001, San Jose Independencia – 2,081, for a total of 19,801. See *Septimo censo general de población,* (Mexico City: Mexico Dirección General de Estadística, 1950).

new place. It represented a "jump from tribal life to the civilized life of a new time; that is to say, a jump of centuries realized in just four days."[51]

Daily life changed considerably for the Mazatec settlers in the new colonization zones. Though still relatively isolated, newly constructed railroads and roads with bus service connected the settlements to the larger cities of Tierra Blanca, Tuxtepec, and the Papaloapan Commission's administrative center of Cuidad Alemán. The settlers began playing modern games of basketball and volleyball, and Villa Rojas celebrated that connections to regional market centers allowed the Mazatecas to supplement their traditional diets with higher protein meats, cheeses, as well as packaged salmon, sardines, and sausages. Though, access to the richer foods of the city also meant access to unhealthy processed foods and alcohol that proved to be irresistibly exotic to the Mazatecas. Villa Rojas recalled meeting a group of Mazateca friends in Tierra Blanca. He invited them to share a meal of enchiladas, "but although they were hungry, they preferred to thoughtlessly ingest sweets and ice cream." Villa Rojas also worried that "the natives" drank so heavily that they demonstrated the typical characteristics of alcoholism. He claimed that all of the towns founded by the Papaloapan Commission maintained a "strict prohibition" against the consumption of alcohol in attempt "to lessen the high degree of … institutional alcoholism that inclined the natives to ingest *aguardiente* on any occasion that they wanted to 'pass the time.'" [52]

In the new colonization zone, initial settlers continued to grow a variety of crops, especially maize, beans, rice, chiles, and sesame on traditional intercropped *milpa*

[51] Villa Rojas, *Los Mazatecos,* 133.

[52] Villa Rojas, *Los Mazatecos,* 153.

fields. Only, in the new communities, the Mazatecas worked the fields collectively, under the guidance of agronomists and technical directors from the Papaloapan Commission. These *técnicos* tried to undertake a survey of soil types and promoted the technological solutions devised by experimental field researchers associated with the Rockefeller Foundation. They hoped to achieve a "social transformation," from "antiquated" agricultural practice to a utopian regime of modern production using hybrid seeds, irrigation, and the liberal application of the pesticide DDT. [53]

Moreover, Villa Rojas and the anthropologists of the INI hoped "to give [the Mazatecas] the incentives necessary for them to create new yearnings or new aspirations that justify their time in this world … [and to promote] the integration of [the] well-balanced" personalities of assimilated members of the national community. According to Villa Rojas, prior to the arrival of the Papaloapan Commission, the Mazatecas represented the very definition of "marginal" people. With the resettlement, they encountered modernity and "the differences of culture presented contrast [both] revolutionary and profound." Indeed, the transform of the Mazatecas into modern farmers directed by the technical experts represented the redemptive possibilities to escape both primitive atavism and the malaise of modern life. For Villa Rojas, the Commission's colonization scheme, "avoids the misunderstandings between advanced technology and moral stiffness that has to be one of the basic propositions that orients the action of men and institutions."[54]

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[53] Villa Rojas, *Los Mazatecos,* 154.

[54] Villa Rojas, *Los Mazatecos,* 154-155.

In the years after he published his study of the resettlement of the Mazatecas in the colonization zone, Villa Rojas became the Central Coordinator at INI, while Aquirre Beltrán assumed a position as the director of the Institute. By the 1970s, each would move on to other projects, though they maintained an interest in the Papaloapan Basin. Through their association with Robert Redfield, they made connections with American anthropologist David McMahon.[55] Working with the INI, McMahon conducted a study of the modernization programs in Ixcatlán, a town on the western shores of the reservoir created by the Miguel Alemán dam. He could not follow up with a study of the same resettlement colonies that Villa Rojas helped create since the combination of poor soils, and the lack of local improvisations insured that colonists abandoned those settlements shortly after their founding.

McMahon's study differed from those of his mentors in key respects. First, he studied a different group of people. He systematically identified three groups of people that were affected by the construction of the Miguel Alemán dam and the other works of the Papaloapan Commission. The Mazatecas displaced by the construction felt the most direct impact, and had been the primary object of study for Villa Rojas and INI officials seeking to create modern agricultural utopian communities. The landowners of the Lower Papaloapan basin, benefitted from the flood control and irrigation works as they expanded commercial production of rice, tree fruits, and cattle ranching. Those beneficiaries of development in the lowlands fascinated the economists that hoped to create a model for tropical development. McMahon, however, focused his study on Ixcatlán, a community of people living above the dam and the reservoir. He argued that

[55] McMahon, *Antropología de una presa,* 9.

those indigenous groups living above the dam were actually the most affected by the construction. For McMahon, understanding how life had changed in Ixcatlán was the key factor in understanding the complex interaction among traditional Indian culture, the national developmentalist state, and the natural environment.[56]

Writing nearly two decades later, McMahon was less concerned than his predecessors with actively facilitating a transition from indigenous folk culture to urban modernity. Though, he still maintained close connections to the Papaloapan Commission and the INI, and celebrated many of the changes that resulted from the Commission's development activities. At first glance, he maintained a more detached tone and deployed research methods from ecology as well as applied anthropology "to identify which direct relationships" between the conditions created by national institutions and local adaptation to a changing ecosystem led to social, political, and economic re-organization among the Mazatecas of Ixcatlán.[57] McMahon constructed theoretical model that drew upon ecologists like Eugene Odum and George Clarke, as well as anthropologists like Robert Redfield, Julian Steward, and Marvin Harris. He attempted to determine how changes in the sociopolitical environment and the physical environment caused changes at the local level. He concluded that ecological changes and economic development benefitted the residents of Ixcatlán in a number of ways. The power of traditional elites eroded as people gained access to public education at the school built by the Papaloapan Commission and took advantage of new economic opportunities. For example, the creation of the reservoir behind the Alemán dam

[56] McMahon, *Antropología de una presa,* 16-18.

[57] McMahon, *Antropogía de una presa,* 20.

allowed for the development of new fishing industry, and the road that the Commission constructed to Tuxtepec allowed Mazatec peasants to transport the products of their labors to more distant markets.[58]

A more critical reading of McMahon's work, however, suggests that he was strongly influenced by his predecessor's work, especially the work of Aguirre Beltrán, and that his conclusions perpetuate the same narrative tropes. Like Aguirre Beltrán, McMahon celebrated the ways in which intervention of the federal government, in this case the Papaloapan Commission, rescued indigenous peoples from the tyranny of local elites. McMahon also echoed the same language as the head of the INI by declaring that "the road – that was constructed by the Papaloapan Commission … united the populations of the Mazatec region and the Chinantec regions [further] north (which are, both, *regions of refuge*) with the capital of the district" [emphasis added].[59] He heralded the local changes the ultimately resulted in the breakdown of a "dual system" of power in which regional elites dominated indigenous *campesinos* and the development a "pluralistic system in which the national interests, in their local manifestations, cooperate and compete with the traditional [interests], but adapt to political, commercial, and economic institutions of power in the town of Ixcatlán and the surrounding area."[60]

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[58] See McMahon, *Antropología de una presa,* 143-150, for his summary of various local, regional, and institutional changes.

[59] McMahon, *Antropología de una presa,* 144.

[60] McMahon, *Antropologá de una presa,* 150.

Conclusion

Anthropologists and economists helped make the complex physical environment and social organization of the Papaloapan Basin legible for the government officials who embarked on an ambitious program of state "high-modernist" development to remake the tropics of southern Mexico into technologically-advanced rural utopia informed by the latest scientific data.[61] Yet, the comprehensive efforts to transform peasants in Oaxaca into modern farmers represented only one part of a broader effort to modernize Mexican agriculture according to the dictates of scientific researchers. The government programs in the Papaloapan Basin constituted just one part of the modernization project that was informed by the "Green Revolution" techniques developed by the Mexican government and the scientists associated with the Rockefeller Foundation. A perceived crisis of food shortages led scientists to focus narrowly on increasing production, largely abandoning many of the more ambitious efforts to remake the social order in order to focus on a problem that was legible to agronomists and could be solved with investment in capital intensive "technological" solutions. However, as the negative consequences of using hybrid seeds requiring massive amounts of costly chemical fertilizers, pesticides became apparent, however, new forms of resistance to government modernization and development schemes emerged and set the stage for a nativist environmentalist critique of new government development projects.

[61] Claudio Lomnitz situates the cooperation between anthropologists and the Mexican state in a deeper historical context dating to the mid nineteenth century. According to Lomnitz, the period from the 1940s through the 1960s marked a high point of collusion between anthropologists and the state. After the disillusionment that followed the 1968 Massacre at Tlatelolco, a new generation of anthropologists critiqued the *indigenista* tradition within Mexico's "national anthropology" that focused on assimilating into the national developmentalist vision. See Claudio Lomnitz, *Deep Mexico, Silent Mexico: An Anthropology of Nationalism,* (Minneapolis: University of Minnesota Press, 2001), 228-262.

CHAPTER 5
THE MENACE OF DOOMSDAY

This chapter places the Papaloapan projects in a broader context by examining the contemporaneous scientific research conducted by a group of agronomists affiliated with the Mexican state and the Rockefeller Foundation. President Miguel Alemán envisioned the development of the Papaloapan Basin as the centerpiece of a comprehensive program to modernize Mexican agriculture and to remake rural society. Rockefeller Foundation researchers were informed by the same high-modernist assumptions that denigrated traditional indigenous knowledge and land use practices and uncritically embraced scientific technological solutions to the narrowly-construed scientific "puzzles." Researchers attempted to implement techniques developed in temperate climates to address concerns about soil fertility in the tropical south. They advocated using hybrid seeds, irrigation, and high levels of chemical fertilizers and pesticides to increase yields. The application of such modern agricultural techniques, however, only proved effective under specific conditions, and irreversibly degraded local environments. Furthermore, the high profile, transnational visibility of the Rockefeller Foundation's collaboration with the Mexican Government attracted attention from a new generation of environmental activists inspired by Rachel Carson's ecological condemnation of the use of the pesticide DDT. I argue that the burgeoning transnational environmental movement that challenged the Rockefeller Foundation's assumptions and practices joined a chorus of dissenting voices that began to challenge the Mexican state's high-modernist faith in science and paved the way for discursively rehabilitating indigenous land use practices and articulating new challenges to state development projects in the tropical south.

In 1947, Miguel Alemán created a new federal administration, the Mexican Corn Commission, as a new liaison with Rockefeller Foundation researchers. Headed by Mexican Senator Gabriel Ramos Millan**,** the commissioners joined Foundation researchers on a visit to the United States. After purchasing tractors and other agricultural implements in a program for the mechanization of corn cultivation, the group visited the Tennessee Valley Authority installations in Chattanooga, Tennessee. They studied the hydraulic works in preparation for the irrigation and hydroelectric projects in the Papaloapan River Basin that were so central to Alemán's plans for Mexican economic development. As Alemán envisioned it, both the Rockefeller Foundation's efforts to produce high-yield hybrid corn, and the six-year, 1.5 million peso projects in the Papaloapan Basin, which was anticipated to bring 250,000 to 1,400,000 new hectares under cultivation, were central to increasing agricultural production.[1]

By 1948, the Office of Special Studies, established as a joint venture between the Mexican government and the Rockefeller Foundation, boasted that they had completely eliminated Mexico's dependence on imported corn as the nation could meet domestic demand for the first time in thirty-five years. A Foundation spokesman stated that the twofold program of creating high-yielding hybrid seeds combined with training Mexican agronomists had succeeded in solving the greatest dilemma facing Mexico in the 1940s. The Foundation representative argued that agricultural production had been dropping at the same time that the state embarked on an ambitious program for

[1] "Mission Arrives Here to Solve Mexico's Corn-Growing Needs," *The New York Times,* 27 June 1947, 14.

industrialization that created greater demands on the labor force. "What Mexico needed," he said, "was more food of high quality for all the people."[2]

Mexican officials believed that they faced a crisis of food production. A lack of food for a growing population could threaten future development plans, undermine the PRI's revolutionary credentials, and ultimately lead to social violence. Solving the crisis of food production, however, could foster further economic development, keep food prices low enough to keep urban labor in line, and disrupt traditional cultures and bring Indian peasants into the modern nation. As evidence from the limits of development schemes in the Papaloapan Basin suggests, scientists and policy officials were ill-equipped to completely manipulate complex natural and social realities, but they could focus on "solving the puzzle" of increasing food production. They were guided by the premise that social problems could be addressed by asserting human control over the processes of production. Their scientific credentials gave them the authority to define the problem based solely on the assumption that agricultural lands in Mexico were not productive enough and they established a discourse in which only certain types of knowledge were endowed with legitimacy and institutional support as "science," while alternative forms of knowledge were neglected and marginalized as "non-science."[3] They devised solutions that fit neatly within the parameters of their own expertise and ideological training and they ignored or marginalized alternatives.

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[2] "Rockefeller Fund Help to Mexico Greatly Increases Nation's Food," *The New York Times,* 16 March 1950, 38.

[3] Bruce H. Jennings, *Foundations of International Agricultural Research: Science and Politics in Mexican Agriculture,* (Boulder, CO: Westview Press, 1988), 192.

Tireless and Devoted Efforts

The Rockefeller Foundation began operating in Mexico during the 1920s, but within two decades had expanded its role to such a degree that experiments in Mexican agriculture would be applied throughout the developing world. The Foundation's early efforts focused on public health campaigns to eradicate yellow fever in the tropical regions of the Yucatán and Veracruz. By the 1930s, Foundation officers, including Dr. J.A. Ferrill who had worked closely with the Mexican Ministry of Agriculture under presidents from Plutarco Elias Calles through Lázaro Cárdenas, began exploring the possibility of a cooperative venture with the Mexican government to improve agricultural productivity. The plans stalled as tensions arose between the Mexican government and the United States when Cárdenas supported a worker's strike against American oil companies and subsequently nationalized the oil industry in 1938, thereby threatening the Rockefeller family's interests in Standard Oil. Additionally, Cárdenas's extensive agrarian reform program directly challenged the potential of programs for increasing agricultural productivity on large landholdings that could generate enough capital and utilize the economies of scale necessary to implement the "scientific" agricultural technologies. By the 1940s, however, a shift in Mexican national priorities under Manuel Avila Camacho combined with the recognition of Mexico's strategic importance to the American war effort to foster conditions that were more amendable to international collaboration.[4]

[4] Marcos Cueto, "Visions of Science and Development: The Rockefeller Foundation's Latin American Surveys in the 1920s," in Marcos Cueto, ed., *Missionaries of Science: The Rockefeller Foundation and Latin America,* (Bloomington, IN: Indiana University Press, 1994), 1-23; Jennings, *Foundations*, 45-48.

In February 1941, US Vice President Henry Wallace, a former Midwest farmer who had successfully adapted the technologies and techniques of industrial scientific agriculture, expressed his desire for an project led by the Rockefeller Foundation to increase Mexican agricultural production. Wallace believed that the philanthropic organization could be apolitical despite connections between the Rockefellers and the oil industry.[5] From July through December 1941, a team of Foundation scientists composed of "qualified persons," including Dr. E.C. Stakman, a botanist from the University of Minnesota, Dr. Richard Bradfield, a specialist in soils and agronomy from Cornell University, and Dr. Paul Manglesdorf, a plant geneticist from Harvard University, surveyed Mexico agriculture. They spent two months traveling 5000 miles around Mexico by automobile and horseback.[6] After the team completed the survey, they called for a program to improve Mexican varieties of maize and wheat through cross-breeding, and they emphasized the need to "improve" agricultural management techniques and train a new generation on Mexican agronomists.[7] They believed that the crisis in Mexican agricultural production was so acute that they proposed going beyond the Foundation's usual practice of funding research through existing institutions and they "felt that the situation required a group of experienced [American] agricultural specialists in full-time Mexican residence."[8]

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[5] "U.S. to Help Mexico on Farm Problems," *The Christian Science Monitor,* 19 November 1942, 7; Jennings, *Foundations,* 47-48.

[6] George W. Gray, "Blueprint for Hungry Nations," *The New York Times,* 1 January 1950, 8.

[7] Deborah Fitzgerald, "Exporting American Agriculture: The Rockefeller Foundation in Mexico, 1943-1953," in Marcos Cueto, ed., *Missionaries of Sceince: The Rockefeller Foundation and Latin America,* (Bloomington, IN: Indiana University Press, 1994), 77-78; Jennings *Foundations,* 48-49

[8] Gray, "Blueprint," 8.

The botanist, E.C. Stakman, argued that the Americans had a moral obligation to apply scientific and technical solutions to the problems of Mexican agriculture. He claimed that American agronomists had solved the dilemma of soil depletion and increased agricultural productivity using chemical fertilizers developed during the Second World War. Mexican farmers, by comparison, "destroyed in four years what nature had constructed through the long process of evolution."[9] For Stakman, using scientific methods and technologies to increase production and reduce hunger represented an ethical imperative. He admonished his colleagues to "develop a scientific attitude and an ethic to solve the global problems of human subsistence." He believed that solving technical problems of production could lead to the "hope for the birth of One World," if only American scientists could "face the facts and alleviate desperate situations with scientific realism and true justice."[10]

Dr. G.C. Payne, the Foundation's representative in Mexico proposed solutions to the Mexican government. In October 1942, the Mexican Minister of Agriculture, Marte R. Gomez, accepted the definition of the problems of Mexican agriculture, defined explicitly and narrowly as problems of increasing production, and he formally agreed to a plan for "'agricultural cooperation.'" Institutionally, the Rockefeller Foundation project, later renamed *Oficina de Esudios Especial* or Office of Special Studies (OEE), oversaw the Mexican Agricultural Program (MAP) under the supervision of the Mexican Secretary of Agriculture (SAM). Later, as the Mexican research center became the hub of international research networks, the project would be renamed *Centro Internacional*

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[9] E.C. Stakman, *La ciencía al servicio de la agricultura,* (Mexico City: Oficina de Estudios Especiales, La Secretaria de Agricultura y Ganaderia de Mexico y La Fundacion Rockefeller, 1949), 8.

[10] Stakman, *La ciencía al servicio de la agricultura,* 28.

de Mejoramiento de Maiz y Trigo, (CIMMYT). The Mexican government agreed to contribute an equal share of the expenses for research to develop high-yield, disease resistant strains of maize and wheat, and for scholarships to train Mexican agronomists.[11] According to one historian, many Mexican agronomists embraced the work of the Rockefeller Foundation because it brought a new sense of prestige to their profession, which had suffered since the 1890s.

Mexican Agronomists traced their professional origins to the establishment of the *Escuela Nacional de Agricultura* (ENA) in 1864. During the late nineteenth century, Porfirio Diaz and his council of *científicos* reformed the curriculum to prepare government advisors and hacienda managers. According to critics, this training failed to provide Mexican scientists with a sufficient background in applied sciences and experimental methods.[12] With the outbreak of the Mexican Revolution in 1910, many agronomists supported the cause of land reform and revolutionary nationalism, and some even served as advisors to revolutionary governments following the cessation of hostilities. Influenced by revolutionary slogans and ideologies, Mexican agricultural scientists tried to simultaneously tackle all of the problems of rural society. They ambitiously, and often counterproductively, tried to focus on a broad range of projects including agricultural development, rural hygiene, and education. They believed that those problems could only be addressed by people familiar with Mexican social and

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[11] "Mexico Accepts Farm Aid," *The New York Times,* 21 October 1942, 6; "U.S. to Help Mexico on Farm Problems," *The Christian Science Monitor,* 19 November 1942, 7.

[12] Joseph Cotter, "The Rockefeller Foundation's Mexican Agricultural Project: A Cross-Cultural Encounter, 1943-1949," in Marcos Cueto, *Missionaries of Science:The Rockefeller Foundation in Latin America,* (Bloomington: Indiana University Press, 1994), 99. One might also acknowledge an older, and somewhat racist and condescending, explanation which asserts that upper class, educated Mexicans were influenced by Spanish aristocratic values that expressed disdain for manual labor in agricultural fields.

cultural traditions. As such, though they were certainly aware of research being conducted in the United States, in the 1930s Mexican agronomists rejected the examples provided by North American experimental sciences and focused on emancipation of the Mexican peasantry as they "expected the farmer, rather than the agronomist, to do the plant breeding."[13]

In 1941, Manuel Avila Camacho's new Minister of Agriculture, Marte R. Gomez, attempted to reform the Ministry by reassigning government personnel to experimental field stations. Gomez's efforts, however, failed to silence critics. Conservatives associated with large landholders, who enjoyed more influence under the Avila Camacho, attacked the scientists for their close political association with the agrarian reform of the 1930s. Even those farmers who had benefited from the land reform had little faith "in the agricultural research community's abilities as scientists or technical advisors."[14] By the 1940s, following a crisis in corn production in the late 1930s, Mexican agricultural scientists attempted to reform their institutional culture and assumptions in order to restore a sense of prestige to their profession.

Gomez acknowledged that the Mexican agricultural experts could not provide farmers with synthetic or hybrid high-yield seeds or chemical fertilizers, and he was forced to implement the highly unpopular measure of forcing all farmers to plant 10 percent of the land in corn to meet the nutritional demands of the country. Larger commercial farmers who would have preferred to plant more lucrative cash crops deeply resented Gomez and accused him of corruption. They argued that he used his

[13] Cotter, "The Rockefeller Foundation's," 100.

[14] Cotter, "The Rockefeller Foundation's," 102.

government office for personal gain. At the nadir of agronomy's prestige, the Avila Camacho administration signed the agreement with the Rockefeller Foundation to professionalize and de-politicize the agricultural sciences.[15]

Though few debates emerged about the specific programs advocated by the Rockefeller Foundation, Mexican agronomists split over political questions. Most agreed that the profession needed to be modernized along the lines suggested by the Rockefeller Foundation, but they disagreed on the question of "which sector of rural Mexico would be targeted by the government's programs."[16] A rift developed as some scientists insisted that they should engage in politically-neutral or objective, technical science, while others continued to cultivate close ties to the *Confederación Nacional Campesina* (CNC), the peasant sector representatives in the reformed corporativist party structure established by Lázaro Cárdenas. Despite such divisions, however, the RF-MAP agreed to allow Mexican scientists to take credit for joint research successes and many Mexican agricultural scientists believed that their work rose in the public's esteem.

In some ways, the encounter between the Rockefeller Foundation and Mexico's scientific community marked a period of convergence that equally benefited both groups. Cooperation with the Rockefeller Foundation proved to be particularly beneficial to Mexican agronomists, and their political allies, who came of age during the 1930s. These scientists and politicians believed that agrarian reform had not solved the problems of rural Mexico and that previous efforts by agronomists to lend technical

[15] Cotter, "The Rockefeller Foundation's," 102-103.

[16] Cotter, "The Rockefeller Foundation's," 105.

assistance had failed as a result of partisanship and a culture among scientists that stressed laboratory research over experimental fieldwork. Both the scientific community and the state benefited from the successes of the Rockefeller Foundation during a crucial period of transition. Scientists "modernized" their training and practices, while the state could pursue the course of industrial development without having to completely abandon the revolutionary commitment to the nation's *campesinos*, even though many Mexicans saw little direct benefit from either the Foundation's research or the state's development programs. Increased productivity allowed the revolutionary state to affirm its earlier commitment to agrarian reform, "without having to pay the price of constant food shortages," and without the political backlash that might have followed if the government had been "forced to terminate [land reform]" in order to pursue a more comprehensive program of agricultural modernization.[17]

Once an agreement had been reached with the Mexican scientific community and with representatives from the government, Warren Weaver of the Natural Sciences division of the Rockefeller Foundation tapped J. George Harrar, a plant pathologist from Washington State College who had taught in Puerto Rico and spoke fluent Spanish, as the head of the Office of Special Studies. Harrar established an office in an "ancient fortress-like building in Mexico City," and the Mexican government allowed the Rockefeller Foundation to establish an experimental station on sixty acres at the Mexican National College of Agricultural at Chapingo. The Foundation began sending students to study at Mississippi State University, Ohio State University, the University of Minnesota, and the University of California. In addition to training Mexican agronomists

[17] Cotter, "The Rockefeller Foundation's," 113.

on fellowships, Harrar also expected to utilize Mexicans as research assistants, who were to form the basis of a "native" scientific community. By 1950, the staff included eleven American researchers, fifty-six Mexican assistants, five Mexican technicians, two visiting scholars from the United States and twelve from Central and South America, as well as Mexican students and administrative workers. [18]

Harrar began his studies by traversing the rugged mountains of central Mexico and venturing "thousands of miles," as he "perspired his way… from the lush tropics of the [Papaloapan Basin] in Vera Cruz to the arid plateaus and mountainous peaks of the north."[19] From Mexican farmers, he collected those seeds and plantings of maize that were the highest yielding and most resistant to pest and disease. Returning the samples to Chapingo, Harrar and other Foundation researchers began cross-breeding the best varieties of maize to create super hybrid varieties. Plant geneticists planted hundreds of acres at Chapingo in the new hybrid varieties. As soon as an ear of corn emerged, they covered the stalk with a paper bag in order to catch the pollen. Scientists then applied the pollen to other designated hybrid varieties to cross-fertilize new varieties of sweet corn and maize. In addition, the researchers applied a less labor-intensive technique that allowed them to cross-breed "synthetic" seeds by planting different varieties adjacent to each other and allowing them to cross-pollinate by wind action and other natural means. A Foundation spokesman claimed that these methods took sixteen superior natural varieties and created "several excellent hybrids" that improved production to "50 to 100 percent" over natural varieties.[20]

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[18] Gray, "Blueprint," 8-28.

[19] Gray, "Blueprint," 8.

[20] Gray, "Blueprint," 27.

The Foundation researchers soon established new experimental stations in the Bajio region, Mexico's agricultural heartland since the colonial period, to begin experimenting with wheat. From the researchers' perspective, Mexican wheat production suffered because the natural varieties were vulnerable to wheat rust, a fungus which flourishes in moist climates and had decimated much of Mexico's wheat crop during the rainy season of 1949. Most wheat production in Mexico occurred in the Bajio and along the coast of southern Sonora, where soils were richer. Though, along the state's "long coastline …winter fogs blow in to blanket the fields with weeks of humidity, [and] growing wheat becomes an easy prey to rust." The wheat crop in 1949 became so devastated by wheat rust that "farmers burned their crops to rid their fields of the useless, infected stalks." Applying the same cross-breeding methods that they employed with corn, whereby they collected and cross-pollinated the most disease resistant strains, Foundation researchers created hybrid varieties of wheat that were not only resistant to wheat rust, but also resistant to insect depredations and drought. [21]

Despite initial success in developing disease-resistant strains of wheat, many of the Foundation's programs failed in Mexico. Deborah Fitzgerald, a specialist on the land-grant colleges and the development of scientifically-managed agriculture, argues that the Rockefeller Foundation imported not just techniques and technologies developed in the radically different context of the United States. They also brought institutional assumptions and cultures that did not fit well with the conditions on the

[21] Gray, "Blueprint," 28.

ground in developing countries like Mexico.[22] Specifically, Fitzgerald notes that the Rockefeller Foundation's activities in Mexico failed as a result of the fact that the Foundation's scientists were trained in the context of land-grant universities in the United States and failed to understand the culture and politics of Mexican agrarian practices. She argues that the Foundation scientists brought a "peculiarly American model of agricultural development" that was characterized by large farms that were capital, rather the labor, intensive, and oriented toward producing surplus crops for markets, rather than for subsistence. Furthermore, the American model of agricultural development emerged in the context of commercial, institutional, and government networks designed to facilitate efficient, high-yielding agricultural strategies.[23]

Mexico, by contrast, lacked such integrated institutional networks and the Rockefeller Foundation-Mexican Agricultural Program soon found itself at odds with its government patrons and with agronomists associated with the Secretary of Mexican Agriculture. For example, when promising young students studied at the graduate school established by the Rockefeller Foundation at Chapingo, or when they received fellowships to complete their training in U.S. universities, they often expected the Foundation to help them find gainful employment in accordance with traditions of patron-client relationships common throughout Mexico. In addition, the American scientists often viewed their Mexican counterparts with a degree of contempt, as the Mexican agronomists focused on experimental laboratory studies, rather than the

[22] Deborah Fitzgerald, "Exporting American Agriculture: The Rockefeller Foundation in Mexico, 1943-1953," in Marcos Cueto, ed., *Missionaries of Science: The Rockefeller Foundation and Latin America,* (Bloomington: Indiana University Press, 1994), 72.

[23] Fitzgerald, "Exporting American Agriculture," 73-74.

applied sciences of field experimentation. With the nationalist pride, many Mexican agronomists came to resent the "foreigners who set up shop," in their country.[24]

Beyond the institutional problems that emerged among Foundation researchers, Mexican agronomists, and government officials, the Foundation's programs failed because they drew on the lessons of North American agrarian structures and failed to account for the realities in Mexico. As such, the Mexican Agricultural Program (MAP) achieved only limited success, as in the case of increasing wheat production, where the modes of production most closely resembled those in the United States. Norman Borlaug, who won the Nobel Prize in 1970 for his work as a leading proponent of applying the technologies of the so called 'green revolution,' successfully cross-bred the most disease-resistant varieties of wheat in order to develop hybrid strains the would be less vulnerable to "wheat rust." Wheat farmers in Mexico rapidly adopted the new strains of hybrid wheat and by 1957, 90 percent of all of the wheat acreage in Mexico was planted with the hybrid varieties. Wheat farmers, rather than the majority of Mexican *campesinos* who grew maize for subsistence, adopted the new technologies because their operations closely resembled those agricultural systems in the United States that had inspired Foundation researchers. Mexican wheat producers generally managed more that seventeen hectares of land, making them comparatively large and wealthy landholders. In addition, wheat production was more capital intensive than subsistence maize farming, and wheat farmers in the northern parts of Mexico had

[24] Fitzgerald, "Exporting American Agriculture," 79.

access to credit to invest in the hybrid seeds, chemical fertilizers, and irrigation that were necessary to produce higher yields.[25]

For the majority of Mexican farmers, smallholders, or *ejidatarios* who engaged in modest or subsistence production, the technologies and techniques advocated by the Rockefeller Foundation amounted to a wholesale repudiation of Mexican agricultural techniques and Mexican agrarian culture. Adopting new hybrid seeds meant accepting a package of agricultural changes that included a heavy reliance on chemical fertilizers and irrigation, and promised, in the long term, soil depletion, pollution, crushing debt, and heavy reliance on the state and local patronage networks for access to credit.

Beyond the scientific sphere, the Rockefeller Foundation also attempted to create goodwill between Mexico and the United States during the 1940s. While acknowledging historic tension between two neighboring countries, one observer noted how the Rockefeller Foundation's work had helped ameliorate the particular anti-American sentiment that had grown in Mexico since the 1940s. During the Second World War, Mexico had allied with the United States, but the U.S. Navy feared that the Japanese had established a submarine base on a desolate peninsula in Baja California. The U.S. Army organized a mission to send troops to destroy the Japanese base, but the Mexican government balked at the thought of American troops crossing into Mexican territory. That prospect brought back images of U.S. troops attacking Mexico in the 1840s, when the United States acquired half of Mexico's national territory, and the Pershing Punitive Expedition of 1916, when a massive American force tried to hunt down the revolutionary hero Pancho Villa. The Mexican Army ultimately attacked the

[25] Fitzgerald, "Exporting Mexican Agriculture," 81-83.

Japanese base, though the incident revealed the continued presence of a deep anti-Americanism among many Mexicans.[26]

Despite such moments of tension, The Rockefeller Foundation helped cement a genuinely close alliance with the United States during the war. By helping Mexico become self-sufficient in corn production, the Foundation allowed U.S. corn farmers to direct their production to the war effort, while the Foundation's focus on expanding production for livestock feed increased the amount of cattle that Mexico exported to the United States during the war. As a number of critics have noted, much of what helped the United States during the war actually limited the food that was available to the majority of Mexicans. The wartime boom in Mexican cattle production was nearly undone by an outbreak of hoof and mouth disease in 1947 that caused U.S. officials to close the border to imported Mexican beef. Here again, however, the Rockefeller Foundation's Office of Special Studies sought to restore goodwill between the two countries by shifting its focus away from the production of Mexican dietary staples and toward the livestock production that benefited Mexican ranchers and US industry. In addition to an aid program through which the Foundation issued public loans at low interest rates, the Rockefeller Foundation succeeded in reopening the border by 1952 through "tireless and devoted efforts," that saw an American mission "[scouring] the countryside, performing not only the technical job of stamping out the disease but also the far more difficult task of educating the Mexican peasantry to accept modern veterinary methods."[27]

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[26] Flora Lewis, "Why There Is Anti-Americanism in Mexico," *The New York Times,* 6 July 1952, 31.

[27] Lewis, "Why There is Anti-Americanism," 31.

The effort to eradicate hoof and mouth disease proved to be only the first step in the Foundations efforts to expand its activities to increase livestock production. Beyond merely providing high-yield hybrid seeds for feed crops, the Foundation signed an agreement with the Mexican government in October 1952 in order to "try to do for livestock and poultry production … what its agricultural program has already achieved …for production and improvement of grains and vegetables." With little concern for the social and cultural context, the Foundation set out to improve ranges and pastures and "to improve Mexican cattle through breeding," as the animal husbandry counterpart to the plant experiments at research centers like the Graduate School at Chapingo.[28]

By the 1950s, the Rockefeller Foundation expanded its activities beyond the scope of its previous efforts. Foundation scientists collaborated with the Mexican government in a number of ways and they began exporting hybrid seeds and "scientific" farming techniques to India and other parts of the postcolonial world, where the so called "Green Revolution" would alter the lives of rural peoples across the globe. In Mexico, Foundation scientists conducted a survey of the "nutritional life" of the Otomi Indians who lived in a highland valley near Mexico City. The researchers determined that the Otomi diet of maguey worms, roasted grasshoppers, and other winged insects actually provided adequate nutrition, but "[t]hat doesn't mean that the Mexican government plans to let the Indians continue to live that close to nature forever." With "interest and enthusiasm," the Mexican government accepted technical assistance from the Rockefeller Foundation scientists in order to design and program "to elevate the

[28] Sydney Grusons, "Rockefeller Unit Widens Mexico Aid," *The New York Times,* 10 October 1952, 6.

quality of [Mexico's] citizenship."[29] As in the Papaloapan basin, ostensibly apolitical efforts to solve a scientific problem accompanied broader projects of social engineering aimed at modernizing a "backwards," indigenous peasantry.

The joint program between the Rockefeller Foundation and the Mexican government called for an education program in which volunteers toured the countryside as "cultural missions … to teach the illiterate to read and write and improve their community life" Additionally, the plan called for employers to allow their domestic servants to attend night school, and encouraged companies to practice welfare capitalism by providing outlets for physical activity, access to healthy food, and modern concrete houses in company towns that would help "to build a healthier and *more productive citizenry.*"[30] Thoroughly paternalistic, researchers defined the sociopolitical problem of modern citizenship as a function of the scientific challenge of increasing productivity. Though in this case, the scientific problem of improving Mexican workers replaced the challenges of improving hybrid seeds of corn or wheat. Ultimately, the Rockefeller Foundation activities in Mexico were guided by the premise that social problems could be addressed by asserting human control over the processes of production. The Rockefeller Foundation scientists could influence public policy and private initiative because their scientific credentials gave them the authority to "define the problem" based solely on the assumption that agricultural lands in Mexico were not

[29] Jules DuBois, "U.S. Helps Mexico Build Better Citizens," *The Chicago Daily Tribune,* 25 December 1952, A8.

[30] DuBois, "U.S. Helps Mexico," A8.

productive enough to promote economic growth or provide the basis for a "progressive social order."[31]

The Rockefeller Foundation's activities established a discourse in which only certain types of knowledge were endowed with legitimacy and institutional support as "science," while alternative forms of knowledge were neglected and marginalized as "non-science."[32] While the goals of the Foundation may have been altruistic, their solutions invariably offered increased production as the only solution to complex social problems. One author describes the Foundation's approach as the "production paradigm."[33] After the Foundation researchers established their authority to define the problem of Mexican agriculture, they devised solutions that fit neatly within the parameters of their own expertise and ideological training. However, by focusing exclusively on increasing agricultural production, the Mexican Agricultural Program ignored or marginalized not only alternative solutions, but also alternative ways of understanding the historical circumstances of Mexican agriculture. Essentially, "advocacy of the production paradigm [was] predicated on the elimination of other modes of investigation." Critics of the Foundation's approach advocated a "social-relations paradigm," which could take account of social relations and unequal distribution of political power in Mexico, and might have offered an alternative path for agricultural development. As it turned out, though, none of the scientists chosen to

[31] Jennings, *Foundations* xi; 185.

[32] Jennings, *Foundations,* 192.

[33] Jennings, *Foundations,* 186

assess the problem of Mexican agriculture had any prior knowledge of Mexican politics or "historical social struggles."[34]

Even when the Foundation officials engaged with Mexicanist scholars, they often ignored dissenting opinions that failed to conform to their own assumptions about Mexican agriculture and Mexican society. For example, Carl O. Sauer, the famed cultural geographer from the University of California at Berkeley worked as a consultant for the Rockefeller Foundation as an expert on Mexican society and culture. He proposed a definition of the agricultural problem that acknowledged the insufficiency of agricultural production, but also addressed traditions and mores of Mexico's peasants. Sauer advised the Foundation to build the agricultural development program on the local knowledge of the *campesinos*, which generally provided people with adequate nutrition, considering the limitations of economic inequalities. According to Sauer, the problems of Mexican agriculture were ones of politics and economics, not problems of limited scientific management and inefficient productive processes. Sauer cautioned against trying to replicate American agricultural strategies in Mexico. He offered an alternative vision "based on a union of natural and social inquiry."[35]

In a 1940 letter to the Rockefeller Foundation, Sauer asserted that investigators should base their conclusions on an intimate knowledge gleaned from years of experience. He argued that an analyst, "should go down into the field again and again, for the particular connotations of a foreign culture … are learned and synthesized slowly. This business is one of cumulative dividends, and one isn't much good at it until

[34] Jennings, *Foundations,* 186-187.

[35] Jennings, *Foundations,* 50-54.

learning gets to the point where one sees the cultural situation from the inside."[36] Sauer first began working with the Rockefeller Foundation when they funded his research trip to Mexico in 1935. The Foundation also funded Sauer's trip to South America in 1942.[37] Impressed with his work, the Foundation agreed to underwrite Sauer's research in Mexico in 1944 and 1945. During this last tour of Mexico, however, Sauer began to challenge some of the assumptions that motivated his institutional patrons. In a 1945 letter from Mexico, Sauer lamented that "the pressure unfortunately is at present for the introduction of American methods, unsuited to [this] country." He believed that agricultural production on indigenous *milpas,* based on intercropping maize, squash, and beans, addressed the problem of nitrogen depletion in the soil more successfully than modern methods could.

Sauer also praised the indigenous people, especially the indigenous groups of Oaxaca. In southern Mexico, he counted "thousands of humble Indians maintaining in spite of everything a dignity and savor of life which [he] should hate to see destroyed." According to Sauer, the Indians needed encouragement and help; "[t]hey need to be encouraged that their ways are good, and they need protection against exploitation." However, Sauer tried not to romanticize indigenous cultural and people. He did "not consider them as simple conservers of old traditions," and he was "not interested in Indians as museum pieces." He was impressed by how well Indians adapted their own

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[36] Correspondence: Carl Sauer to Joseph Willits, 20 September 1940, in Robert West, *Carl Sauer's Fieldwork in Latin America,* (Ann Arbor: Department of Geography, Syracuse University by University Microfilms International, 1979), 12.

[37] Sauer's letters to the Rockefeller Foundation during this period have been collecting in Carl O. Sauer, *Andean Reflections: Letters from Carl O. Sauer While on a South American Trip Under a Grant from the Rockefeller Foundation, 1942,* ed. Robert C. West, Dellplain Latin American Studies, No. 11, (Boulder, Co: Westview Press, 1982).

practices and traditions to changing socio-economic conditions, and he attacked the "standardizing tendencies which [were] flowing from the urban centers to strip the country of its goods and its ablest men and pauperize it culturally, as well as economically."[38] After years of collaboration with the Rockefeller Foundation, Sauer challenged the very assumptions that motivated their mission in Mexico. He argued that Mexican agricultural systems were sufficiently productive, and that indigenous practices and cultures should be adapted to modernity, rather than suffer destruction at the hands of scientists and government administrators. In the end, the Foundation ignored Sauer's recommendations.

In 1953, the Foundation teamed with officials from the Mexican Social Service agency, IMSS, "to attack the problem of malnutrition in Mexico." Building on early experiences from public health campaigns, the program established a system in which food would be distributed to the needy and hungry if they obtained prescriptions from a doctor, as if food were a potential dangerous controlled substance that would be abused by the lower classes.[39] The Mexican government and Foundation researchers increasingly emphasized programs to feed the needy as their limited successes in agricultural productivity failed to provide for the demands of a growing urban population. In many parts of rural Mexico, rocky, mountainous terrains imposed on *campesinos* a precarious lifestyle that was increasingly untenable. On steep slopes, deforestation from overgrazing promoted levels of erosion that saw "500 million cubic yards of

[38] Correspondence: Carl O. Sauer to Joseph Willits, 12 February 1945, in West, *Carl Sauer's Fieldwork,* 199-122.

[39] "Mexico to Feed Needy," *The New York Times,* 12 November 1953, 28.

Mexican soil … carried to the sea each year."[40] To a limited degree, the Foundation's efforts to increase agricultural productivity helped offset the loss of arable lands, though, many of their efforts were aimed at Mexican commercial interests rather than at providing for basic nutrition.

One of the most profound consequences of the Foundation's assumptions and efforts merely to increase agricultural production paradoxically reduced the amount of food that could be produced for the majority of Mexicans. By emphasizing increased productivity detached from sociopolitical contexts, Foundation researchers advocated restructuring the Mexican agricultural landscape in ways that removed the scientific goal, increasing agricultural production, from the sociopolitical aim of feeding the Mexican population. The hybrid seeds that the Foundation scientists had developed required a mobilization of resources that was beyond the means of most Mexican *campesinos* and *ejidatarios.* In order to implement the Foundation's programs, farmers were required to purchase new seeds each year, to buy expensive chemical fertilizers, and to maintain access to water for irrigation.[41] By 1966, only 10 percent of Mexican farmers had adopted the high-cost hybrid maize seeds.[42] With little concern for the traditional staples of the Mexican diet, researchers focused their single-minded efforts, and their budgets, on increasing production of crops that were of questionable value for feeding the Mexican population.

As early as 1948, Foundation researchers established an experimental research station at La Cal Grande in the agriculturally-rich region of the Bajio, and they began

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[40] "Mexico's Hungry Millions," *The London Times,* 19 July 1957, 11.

[41] Jennings, *Foundations,* 65-68.

[42] Jennings, *Foundations,* 72.

experimenting with new crops, namely sorghum and barley, which played a remarkable small role in the diets of most Mexicans. Sorghum and barley, however, represented important crops for Mexican and American firms concerned with producing commercial products for national and international markets. In a 1951 Rockefeller Foundation report, Dr. Herrell DeGraff predicted that production of sorghum would expand to a much larger percentage of Mexico's agricultural land despite the fact that it was "'not acceptable as a food grain in Mexico."'[43] From a scientific perspective focused solely on increasing production, however, sorghum proved attractive to Foundation researchers. Unlike maize or wheat, it could be grown in many of the arid regions of rural Mexico. Additionally, Foundation scientists speculated that sorghum could be used to feed livestock that produced cheap meat for export markets, rather than for meeting the subsistence needs of the majority of Mexicans.

The Foundation mobilized its resources to pursue only those projects that confirmed the logic of their focus on increasing production. Furthermore, they followed "the logic of profit, not consumption," by supporting projects that benefited larger commercial interests rather than subsistence farmers.[44] Research into increasing barely production followed a similar logic. As was the case with sorghum, Mexicans consumed very little barley as part of the diets. From 1930 to 1945, production of barley increased from approximately 70,000 tons to 115,000 tons. Most of the production was

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[43] Dr. Herrell DeGraff, Report to Joseph Willits, 10 September 1952, (Madison, University of Wisconsin, Land Tenure Center Files), 49-50; quoted in Jennings, *Foundations,* 73. The fact that the Rockefeller Foundation relied on DeGraff's testimony reveals much about how strictly "scientific" knowledge actually served the interests of large ranchers and producers of cattle feed. DeGraff was an expert on beef production. See Herrell DeGraff, *Beef Production and Distribution,* (Norman: University of Oklahoma Press, 1948).

[44] Jennings, *Foundations,* 75.

used for livestock feed, though some of the barley was used for the production of malts used to make beer. In the early 1950s, the Rockefeller Foundation scientists began experimenting with barley at the behest of Mr. Ziegler, the representative of the Mexican Association of Malters. George Harrar, head of the Mexican Agricultural Program, soon decided to suspend barley research to avoid any appearance of impropriety that came from working so closely with private commercial interests. Harrar advised Ziegler, however, to approach the Sub-Secretary of Animal Husbandry, who might persuade the Minister of Agriculture, Flores Munoz, to include barley research as a part of the Mexican Agricultural Program's future agenda. And, a leading Foundation scientist, Dr. Warren Weaver, gave a paper in Milwaukee to an audience that included representatives from Anheuser Busch, Fleishman Malting Company, Pabst Brewing, Schlitz Brewing, Archer Daniels Midland, and Pillsbury. Weaver encouraged the industry leaders by explaining the commercial potential of hybrid seeds.[45] As in the case of sorghum, the single-minded focus on increasing agricultural production brought researchers closer to commercial interests and caused them to neglect their mandate to feed Mexico's population. In the process, they ultimately divorced the scientific goal of increasing production from the sociopolitical goal of producing food. One scholar concluded that the Rockefeller Foundation's most profound influence was, in fact, "the reproduction of particular styles of thought [which led to] the empowerment of scientific

[45] Jennings, *Foundations,* 75-76; Weaver had been an expert in physical sciences at the University of Wisconsin before he joined the Rockefeller Foundation staff. As Director of the Division of Natural Sciences, he promoted genetics as a scientific sub-specialty that could combine theories from physical science with practices from applied biology. He discusses his experiences with the Foundation in his memoirs, Warren Weaver, *Scene of Change: A Lifetime in American Science,* (New York: Charles Scribner's Sons, 1970), 58-75.

communities [and, presumably, large commercial interests in Mexico and the United States]."[46]

In 1959, Mexicans faced the prospect of importing wheat for the first time in three years. Commercial millers in Mexico complained that it was too difficult to produce flour and bread from the Red Lerma soft wheat variety that dominated Mexican production. Additionally, despite more than a decade of research, the Rockefeller Foundation researchers had failed to eradicate wheat rust and other plant diseases. Though, the Mexican government bore some responsibility for the shortage as the guaranteed price for wheat, 930 pesos or $74.40 per metric ton, had remained stagnant for years. Ultimately, Mexican wheat farmers responded by reducing the acreage they planted in wheat since their expenses rose dramatically as they adopted the capital intensive techniques and technologies promoted by the Rockefeller Foundation.[47]

Researchers and government officials ignored such consequences and continued to promote hybrid seeds, with their attendant package of needs for irrigation, expensive pesticides, and chemical fertilizers, to increase agricultural production. Indeed, Foundation scientists were so confident in their ultimate success that they began exporting their package of reforms throughout the Americas and other parts of the postcolonial world, particularly to India and Africa, where the "Green Revolution" altered agricultural practices for a generation. In India, Foundation scientists began experimenting with rice, and soon they established a research center in the Phillipines. Rockefeller Foundation scientists pioneered a global movement which included efforts

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[46] Jennings, *Foundations,* 189.

[47] Paul P. Kennedy, "Wheat Shortage Looms in Mexico," *The New York Times,* 20 December 1959, 20.

by the International Institute of Tropical Agriculture in Nigeria, the International Center for Tropical Agriculture in Colombia and projects funded by the Ford Foundation, the Kellogg Foundation, and the United States Agency for International Development. Combined, these efforts aimed to hold off a Malthusian crisis by deploying hybrid-seed technologies developed first in Mexico to feed the world's growing population.[48] By the 1970s, however, considerable debate emerged as the long-term consequences began to emerge in Mexico, where the Rockefeller Foundation first developed the new seeds and technologies.

A Little Blunt Talk

Critics argued that the achievements claimed by the Rockefeller Foundation, "were too artificial to merit revolutionary-sounding labels." They suggested that increased yields may have resulted from the extension of production into marginal lands, or from a period of unusually good weather. In addition, critics worried about the potential long-term consequences of adopting Green Revolution technologies. They argued that only large, commercial enterprises could pressure the state to construct expensive public works projects for irrigation. They also noted that the wealthy landowners were the only people with the resources to purchase expensive inputs. The resulting rural underdevelopment would likely lead to "unemployment and migration of the landless to already overcrowded cities." In addition, critics worried that widespread adoption of genetically-uniform "miracle" seeds would make the world's food supply vulnerable to "miracle" plant diseases and "super" pests.[49] Finally, skeptics claimed that

[48] Israel Shenker, "'Green Revolution' Has Sharply Increased Grain Yeilds but May Cause Problems," *The New York Times,* 22 October 1970, 18.

[49] "Crop Failure Danger Due to New Grains to Get Urgent Study," *The Wall Street Journal,* 15 March 1971, 25.

proponents of the Green Revolution exacerbated the very Malthusian crisis that motivated their research and justified their influence. William Paddock, an American agricultural expert who was pessimistic about the new techniques, claimed that increased production encouraged rural families to have even more children. Discussing a farmer that he had met in the Philippines, Paddock said that, "'the farmer had 10 children and said that because of the new high yielding variety, he and his neighbors would now have enough food for all, and all could enjoy seeing their women in the condition in which they were most beautiful - pregnant."[50]

Such evidence is anecdotal, to be sure, but it is suggestive about the nature of the early critique. Looking backward from the present, scholars might assume that critics of the Green Revolution were primarily concerned with the environmental consequences of chemical pesticide and fertilizers, and those concerns would soon come to the fore as a result of the environmental movement sparked in the United States by the publication of Rachel Carson's *Silent Spring.* Initially, however, skeptics challenged Green Revolution advocates on their own terms and they focused primarily on the socio-political consequences of the Revolution's successes, rather than its environmental failures. Taken together, the early critiques warned that vulnerable food production would ultimately lead to social tension, and social violence. According to one commentator, "with frustrated expectations [comes] an increasingly explosive social force, [and] there is only danger in a rhetoric which suggests that salvation is at hand."[51] Earlier, as United States Secretary of Defense, Robert McNamara worried about the

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[50] William Paddock, quoted in David C. Anderson, "A Squabble over Green Revolution," *The Wall Street Journal,* 6 October 1970, 22.

[51] Anderson, "A Squabble Over 'Green Revolution,'" 22.

ways in which population growth contributed to social tensions, he declared that "the years that lie ahead for the nations in the southern half of the globe are pregnant with violence."[52]

Rockefeller Foundation scientists also saw their mission in such impassioned moral terms, and tensions exploded when Norman Borlaug, the head of the RF-MAP who had first developed rust-resistant wheat hybrids, was controversially awarded the Nobel Peace Prize in 1970. At the time, Borlaug was only the fifth American to win the award, and he joined such American luminaries as Dr. Martin Luther King and Gen. George C. Marshall. In presenting Borlaug with the award, Mrs. Aase Lionaes, the head of the Lagting section of the Norwegian parliament that grants the Nobel Peace Prize, declared the "the world has been oscillating between fears of two catastrophes – the population explosion and the atomic bomb." She claimed that "both pose a mortal threat," and that Borlaug's work helped save mankind. "In this intolerable situation," she argued, "with the menace of doomsday hanging over us, Dr. Borlaug comes onto the stage and cuts the Gordian knot."[53] Borlaug, himself, expressed the moral imperative of using modern technologies to feed the world's people. He feared that "the world's population problem is a monster which, unless tamed, will one day wipe us from the earth's surface."[54] Elsewhere, he told a news reporter that even with the Green

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[52] Robert McNamara, quoted in "Peace and the Green Revolution," *The Washington Post, Times Herald,* 23 0ctober 1970, A24.

[53] Aase Lionaes, Frederick W. Haberman, ed., *Nobel Lectures: Peace 1951-1970*, (Amsterdam: Elsevier Publishing Company, 1972); accessed through the Nobel Prize website. URL: http://nobelprize.org/nobel_prizes/peace/laureates/1970/press.html, 1 March 2009

[54] Norman Borlaug quoted in "Yank Grain Scientist Wins Nobel Peace Prize," *The Chicago Tribune,* 22 October 1970, 2.

Revolution, "we have only delayed the world food crisis for another 30 years. If the world population continues to increase at the same rate, we will destroy the species."[55]

Controversy erupted again a year later when Borlaug defended the use of the pesticide DDT. Speaking to a thousand delegates from 125 countries at the 16th Governing Conference of the United Nations Food and Agriculture Organization (FAO), Borlaug used his prestige and status to attack the "irresponsible [and] . . . privileged environmentalists" who had launched a "diabolic, vitriolic, bitter, one-sided attack on the use of pesticides." He claimed that the American environmental movement could claim a membership of no more the 150,000 people whose disproportionate influence makes them "extremely effective at . . . brainwashing the general public" and threatening the future of the world.[56] He argued that a ban on DDT would cause "crop losses to soar 50 percent and food prices to increase four to five times." The "forgotten world . . . 'will disintegrate into social and political chaos.'"[57]

With the public battles over the use of pesticides like DDT as part of a package of green revolution technologies, mainstream environmental concerns in the United States converged with the issues confronting Mexico's rural poor. Some have argued that environmentalism in Mexico emerged either from regulatory initiatives driven by state priorities or from middle class Mexico City residents concerned with urban air and water quality. While such interpretations certainly offer significant insights into

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[55] Norman Borlaug, quoted in "Peace and the Green Revolution," *The Washington Post,* 23 October 1970, A24.

[56] Norman Borlaug, quoted in Marvine Howes, "DDT Use Backed by Nobel Winner," *The New York Times,* 9 November 1971, 15.

[57] Norman Borlaug, quoted in Michael McGuire, "'Hysteria' Over DDT Hit by Nobel Winner," *The Chicago Tribune,* 9 November 1971, A8.

environmentalism in Mexico, they largely ignore how nascent calls for environmental justice appealed to broad transnational constituencies.

By the mid 1970s, proponents of the Green Revolution undertook a broad public relations campaign to attack their critics and to sell hybrid seeds to developing countries. Borlaug claimed that he and other scientists "'can't just sit here in Mexico and expect [the problem of world hunger] to go away.'" He and his colleagues visited farms throughout the world to offer advice and expertise, what Borlaug called '"a little blunt talk where it'll do some good."'[58] With a paradoxical awareness of the politically-sensitive concerns about imposing foreign technologies on local cultures, Borlaug and other agronomists refused to sell finished hybrid seeds. Instead, they stopped short of the final steps and gave only unfinished varieties to national breeding programs for their final finishing and release. That way, national research institutes could claim credit for developing the seeds, which could be released under local names. Researchers believed that farmers would adopt the new seeds more readily if they resulted from national research efforts. One particularly successful variety of wheat, "8156," had been released around the world under thirty different local names. Though, all local variations were subjected to quality control inspections and had to "pass muster in the biochemical and industrial quality laboratories of [CIMMYT scientist] Dr. Evangelina Villegas."[59]

Borlaug continued to be the center of controversy. His supporters credited him with more than just saving the world through feats of scientific genius. He also shared his daily breakfast of coffee and *huevos rancheros* with Mexican campesinos, and he

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[58] Norman Borlaug, quoted in Boyce Bensberger, "Science Gives New Life to the Green Revolution," *The New York Times,* 3 September 1974, 1-31.

[59] Renseberger, "Science Gives New Life," 31.

reportedly introduced Little League baseball to Mexico. In the fields of northern Mexico, he wore the baseball cap of the Mexico City Aztecas, the Little League team he had coached to an all-star season.[60] However, criticism mounted through the early 1970s. In 1972, after a crop failure in Ukraine and Russian, traders purchased large quantities of grain from Chicago exchanges, causing wheat shortages in the Western Hemisphere. And the OPEC oil embargo caused prices of petroleum-based fertilizers to rise. Critics renewed their attacks on Green Revolution technologies that were genetically vulnerable to super-pests, and primarily benefitted wealthy landowners who could afford the high costs of fertilizers and pesticides. Borlaug responded to his critics by arguing that his team continued to research new cereal varieties, including the first ever man-made grain, "triticale," which genetically combined different species of wheat and rye. In addition, Borlaug claimed that they were working on an interspecies crossbreed of cereals and legumes, which could replenish nitrogen in the soils without the application of chemical fertilizers. Borlaug reserved his most vehement attack for those who challenged the socio-political consequences of his work. He "heatedly rebutted," claims that his research only benefitted wealthy landowners by saying "I get so damned much criticism about making the rich richer and the poor poorer. Well, our primary concern has been to produce food; We're not a land reform agency."[61]

In 1976, the United Nations Research Institute for Social Development (UNRISD) and the United Nations Development Programme co-sponsored a research project to

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[60] Alan Anderson Jr., "The Green Revolution Lives," *The New York Times,* 27 April 1975, 1; Official sources from Major League Baseball claim the Mexican Little League began in the 1920s. See, Jesse Sanchez, "History of Baseball in Mexico," http://mlb.mlb.com/news/article.jsp?ymd=20040107&content_id=626058&vkey=news_mlb&fext=.jsp&c_id=null, accessed 26 March 2010.

[61] Norman Borlaug quoted in Anderson, "The Green Revolution Lives," 90.

move beyond consideration of technical "advances" by investigating the social and political impact green revolution technologies.[62] In the study, Cynthia Hewitt de Alcantara focused specifically on the green revolution as a "particular 'package' of practices and inputs (including the utilization of improved seeds, the application of chemical fertilizers, insecticides, and herbicides and the careful control of water) required to exploit the potential for high yields bred into new varieties of food grains through genetic research."[63] The study concluded that the introduction of new agricultural technologies distorted and denigrated all segments of rural society in Mexico. Indigenous people who retreated from modernization faired relatively well, but *ejiditarios* who tried to adapt to changing circumstances often alienated their alloted parcels of land "in tacit recognition of the gaping disparity in productive potential which separated them from better organized, and more politically powerful neighbors." Relatively wealthy farmers suffered "psychological damage" because they could not enjoy the purchasing power and conspicuous consumption of the large landholders who could afford expensive chemical fertilizers and pesticides.[64]

Even the greatest beneficiaries of the green revolution, the large commercial farmers, never became truly self-sufficient. In order to utilize the genetically-engineered seeds, large farmers leveraged their political connections and relied heavily on state subsidies for the construction of irrigation and infrastructure works that were necessary to produce high yields. Furthermore, the study found that such government

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[62] Cynthia Hewitt de Alcantara, *Modernizing Mexican Agriculture: Socioeconomic Implications of Technological Change, 1940-1970,* (Geneva, United Nations Research Institute for Social Development, 1976).

[63] Hewitt de Alcantara, *Modernizing Mexican Agriculture,* xiv.

[64] Hewitt de Alcantara, *Modernizing Mexican Agriculture,* 331-315.

expenditures could have been allocated more effectively to distribute marginally lower producing technologies across a much broader segment of rural society. Ultimately, the study concluded that, in Mexico, there was no correlation between modernization and development, and that most rural residents never enjoyed improved standards of living. Above all, the experiment with new agricultural technologies and methods was marked by waste of human and natural resources.[65]

Conclusion

When the Mexican government initiated the Papaloapan projects in the late 1940s, the Alemán administration simultaneously supported collaboration with the Rockefeller Foundation to remake Mexican agriculture, and agricultural sciences, using modern technologies and scientific methods. As the project evolved through the 1970s and underwent a series of institutional changes, researchers increasingly focused on solving a scientific puzzle of increasing yields with hybrid seeds, pesticides, and chemical fertilizers, rather than addressing complex social and nation-building priorities. When the proponents of the "Green Revolution" led proselytizing efforts to spread the high-modernist faith throughout the developing world, however, they attracted attention from a transnational environmental movement that exposed the ecological devastation wrought by heavy applications of toxic chemicals. When a new generation of Mexican politicians, led by President Luis Echeverría, attempted to revive the Papaloapan projects in the 1970s, critics challenged the underlying assumptions that guided the state's high-modernist, utopian designs and began articulating a discourse championing traditional indigenous environmental stewardship. The next chapter examines the

[65] Hewitt de Alcantara, *Modernizing Mexican Agriculture,* 305-322.

discourse of nativist environmentalism that emerged in response to Echeverría's efforts to revive the agrarian populism of the Cárdenas era by focusing on rural development and new public works construction in Papaloapan basin.

CHAPTER 6
TO SETTLE ACCOUNTS

The shift in state priorities after 1940 and the Cold War focus on developmental projects to increase agricultural production led, in the short run, to a rapid increase in Mexican economy that has been dubbed “The Mexican Miracle.” The Papaloapan projects and the Rockefeller Foundation’s efforts to increase agricultural productivity were part of the state’s reorientation during the 1940s to focus on capitalist development and integration into global markets rather than on the radical land reform that had characterized the state’s efforts in the1930s. The Papaloapan projects and the Rockefeller Foundation’s work was representative of the state’s efforts during the postwar period as they relied on large-scale, capital-intensive interventions that did little to improve the lives of peasants and workers. The rising gap between rich and poor exposed the contradictions of the “Mexican Miracle” as population increases and rural displacement forced many people to the burgeoning shantytowns that ringed Mexico City and other major urban areas. Dissenters became increasingly critical of the postwar state’s focus on capitalist development and of the exclusivity and corruption of the official party. Tensions mounted as students from the National University (UNAM) and the National Polytechnic Institute (IPN) protested in the streets of Mexico City as PRI officials prepared to showcase the nation’s “progress” by hosting the 1968 summer Olympic Games.

The state responded by repressing protesters and on October 2, 1968, government troops opened fire on 10,000 student demonstrators assembled at the Plaza de Las Tres Culturas in Tlatelolco. Accurate figures for the numbers killed and wounded are difficult to determine. Historians Colin MacLachlan and William Beezley

suggest that some 325 people were killed, 2000 were wounded and another 2000 were jailed.[1] In the aftermath of the Tlatelolco Massacre, the incoming Mexican President, Luis Echeverría faced a new set of challenges. The economic growth of the 1950s and 1960s had stalled by the early 1970s and the Institutional Revolutionary Party seemed increasingly corrupt, autocratic and repressive. Echeverría tried to appeal to dissenters and critics, but he continued to favor the kinds of large-scale rural development projects that his predessesors had pursued since the 1940s.

After years of neglect, government officials again turned their attention to the tropical regions of the Papaloapan Basin in the early 1970s. Mexican President Luís Echeverría tried to cultivate broad popular appeal by focusing on rural development. He stressed Mexican nationalist solutions to agricultural problems and he drew upon a new language of environmental responsibility. In practice, however, his programs focused on large-scale public works projects and technological solutions to problems of agricultural productivity and environmental stewardship. In many ways, Echeverría's policies represented a continuation of the mid-century developmentalist priorities of the Alemán era. The early 1970s, then, was a key turning point. The emergence of a nativist environmental discourse of the 1970s represents one of the key factors in the genesis of new social movements that challenged older PRI state-formation strategies and created a new political climate and new avenues for entrance into the political sphere for marginalized social actors. Under Echeverría, a reinvigorated Papaloapan Commission began construction on a second dam in the Oaxacan Highlands, and renewed its commitment to developing the tropics using modern agricultural technologies and

[1] Colin MacLachlan and William Beezley, *El Gran Pueblo: A History of Greater Mexico*, third edition, (Upper Saddle River, NJ: Prentice Hall, 2004), 402.

centralized planning to bring the region and its people into the modern nation. By the 1970s, however, a broad array of dissidents, including students, environmentalists, critical anthropologists, and local community leaders, challenged the state's high-modernist development schemes. New social actors articulated a discourse of nativist environmentalism that questioned an uncritical faith in science, re-evaluated indigenous knowledge, and re-imagined relations between the state and rural tropical communities.

Luís Echeverría visited the campus of the National University to give a speech opening the academic year in 1975. While trying to speak, he was drowned out by students shouting "Out! Out!" They waved banners that proclaimed, "Assassin" and "Remember 1968." He cut his visit short in response to the angry crowds. As he tried to leave, protesters showered him with bottles, stones, and broken bricks. Echeverría was hit in the head, but he was not seriously injured.[2] Echeverría believed that his administration's economic reforms had gained him student support, but angered the United States. Soon he began to believe that the C.I.A. was behind the attack. He claimed that "'Fascist youths manipulated by the C.I.A. were to blame,'" while his Foreign Minister Emilio Rabasa said that "'one must presume that the C.I.A. operates in all Latin American countries unless there is proof to the contrary.'"[3] With many of his policies as president, Echeverría tried to atone for his role in the Massacre of Tlatelolco in 1968. As president, Echeverría presented himself as a leftist reformer. However, he was unable to appeal to students. Increasingly, Echeverría's populist posturing focused on challenging the United States over environmental concerns and water rights, and on

[2] Alan Riding, "Irate Leftists Attack Echeverría at Mexico's National University," *The New York Times,* 15 March 1975, 57; "Echeverría is Attacked on Campus," *The Washington Post,* 15 March 1975, A11.

[3] Luis Echeverría and Emilio Rabasa, quoted "Mexico Blames C.I.A. for Stoning," *The New York Times,* 18 March 1975, 7.

rural development in the Papaloapan Basin.[4]

When Gustavo Diaz Ordaz and the PRI leadership selected Luis Echeverría as the official presidential candidate in 1970, many critics attacked him and argued that, as Minister of the Interior, he had been the government official most directly responsible for the violence at Tlatelolco in 1968. During his *sexenio*, Echeverría attempted to cultivate a populist image by addressing problems of rural development and confronting the United States over issues of international water rights. However, Echeverría had to confront increasingly militant mobilization from Leftist guerillas, the end of the "Mexican Miracle" that witnessed unprecedented ecocomic growth but was also marked by rapid population growth and high inflation, and the bankruptcy of PRI's hegemony in the aftermath of the 1968 Tlatelolco Massacre. In the words of one Mexican historian, "1968 was . . . the highest point of authoritarian power and the real beginning of its collapse . . . [a] decline [that] . . . lasted for twenty-nine years."[5]

Echeverría assumed the mantle as the leader of Mexico determined to erase the memories of 1968. He campaigned across the country with enthusiasm, though he was guaranteed victory through the machinations of the official party. As president, he courted professors and intellectuals like Carlos Fuentes and Daniel Cosío Villegas who had been outspoken critics of the regime and tried to conjure the populist magic of Lázaro Cárdenas, despite an increase in guerilla opposition to the PRI. In public

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[4] Echeverría also believed he could garner leftist support by offering asylum to Salvador Allende's widow, and by promoting a package of laws to outlaw discrimination against women and change Mexican attitudes of *machismo*. See "Revisions in Mexican Laws Proposed to Aid Women and End 'Machismo,'" *The New Your Times,* 20 October 1974, 29; "Echeverria Strikes Blow for Women," *The Chicago Tribune,* 2 September 1974, 7.

[5] Enrique Krauze, *Mexico: Biography of Power, A History of Modern Mexico, 1810-1996,* trans. Hank Heifetz, (New York: HarperPerennial, 1998), 737.

pronouncements, he aligned Mexico with developing countries fighting for national liberation against "economic colonialism."[6] He challenged the United States over international water rights and pressed for environmental legislation, even as key public officials resigned in the wake of paramilitary violence targeted student protesters on Corpus Christi Thursday, 1971. Echeverría also committed to a program of rural development funded and directed by the state. Critics charged the he was plunging the country into debt, that he seemed increasingly erratic and "bore the mark of his almost schizophrenic character."[7]

Echeverría promised that his administration would push "'onward and upward with Mexican Revolution and the Constitution of 1917,"' and he tried to draw particular attention to the needs of "the struggling peasants and disenchanted young people." In one of his campaign speeches he announced that he "'always believed . . . that the Mexican Revolution still owes a very great debt to the *campesinos* of the country, a debt that will have to be paid in full."' He called on young people to fully participate in the electoral process, "'to choose freely among the parties and to vote according to ideological convention."'[8] Observers noted, however, that Echeverría was not campaigning for support at the polls, since he was assured victory as the PRI's official candidate, and he was unlikely to court students who believed the former Minister of the

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[6] "Mexico's President on U.S.-Latin American Relations." CQ Press Electronic Library, Historic Documents Series Online Edition, hsdc72-0001191560. Originally published in *Historic Documents of 1972* (Washington: CQ Press, 1973). http://library.cqpress.com.ezproxy.lib.ucf.edu/historicdocuments/hsdc72-0001191560 (accessed October 1, 2010).

[7] Krauze, *Mexico: Biography of Power,* 750. This is not intended as a psychological portrait of the Mexican president, though his policies do indeed seem contradictory and contemporary critics like Cosío Villegas, and historians have drawn attention to Echeverría's mental state.

[8] Luis Echeverría, quoted in Francis B. Kent, "Leading Mexican Candidate for President Stumps Early," *The Washington Post, Times Herald,* 9 November 1969, 108.

Interior was responsible for the Tlatelolco Massacre. Instead, he was "getting acquainted with the issues he will have to face as president."[9]

In the town of Tantoyuca in northern Veracruz, he ate a local meal of cheese, salted beef, beans with chiles, and stewed local plums as he listened to a mariachi band sing, "Luís Echeverría is intelligent and pleasant/We're going to have a president with the heart of a peasant."[10] Despite the show of support, the meeting demonstrated key problems that Echeverría would try to address as president. Local community leaders called on Echeverría to build a high school for 1,500 students and demanded a new municipal water supply system. Though his program emphasized large – scale irrigation projects, rather than land reform. In the end, Echeverría drew upon a populist revolutionary language, but continued many of the policies that defined the shift in state priorities after 1940. Such contradictions won him few converts among students and *campesinos*. Guerrilla opposition to the PRI increased during Echeverría's tenure to such a degree that he and his family became direct targets. In terms of rural development, he tried to conjure the populist mystique of Lázaro Cárdenas, but proved to be the heir to Miguel Alemán by focusing on public works construction, which included a diplomatic battle with the United States over international water rights and a renewed focus on irrigation for commercial agricultural development in the Papaloapan Basin.[11]

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[9] Kent, "Leading Mexican Candidate," 108.

[10] Juan de Onis, "A Sure Winner for Presidency is Campaigning Hard in Mexico," *The New York Times,* 27 June 1970.

[11] In addition, Echeverría tried to assert state control over the economy, pass the first environmental legislation to curb industrial pollution, and promote gender equality by banning "machismo."

Of course, Echeverría did not become the new darling of the radical student movement and the Left. Violence increased and the president became increasingly paranoid about plots against him and his government. In his first state of the nation address to Congress, Echeverría warned of a Communist plot to disrupt the social order and topple the government as guerrilla movements accelerated a kidnapping campaign that targeted public officials and wealthy landowners.[12] Based on testimony from seven men captured and interrogated by the Mexican Army, the government accused the rural guerilla group Revolutionary Action Movement (MAR) and its intellectual leader Genaro Vasquez Rojas, of kidnapping bankers and fifteen other public officials in the southern state of Guerrero. The government also charged that the urban guerrilla groups, Armed Commandos of the People and the Movement for Revolutionary Action, were implicated in plots to kidnap former President Miguel Alemán and U.S. ambassador, Robert McBride. A government spokesman claimed that the guerrillas were linked to a foreign conspiracy and had committed a rash of bank robberies in the Mexico City and elsewhere.[13] In the meantime, prominent leftist intellectuals like Carlos Fuentes and Octavio Paz, who had formerly supported the Echeverría regime, joined labor and student leaders to form a new movement dedicated to pressuring the government for progressive reforms.[14]

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[12] Barry Bishop, "Red Terrorists Seek Downfall of Mexico: Echeverría," *The Chicago Tribune,* 2 September 1971.

[13] Marlise Simons, "Mexican Guerrillas Charged With Kidnappings," *The Washington Post, Times Herald,* 11 September 1971, A12; "Mexico Blames Rebels for Raids," *The New York Times,* 20 September 1971, 8.

[14] Marlise Simons, "Mexican Leftists Form New Group," *The Washington Post, Times Herald,* 23 September 1971. Many Mexican intellectuals would late come under fire for their cooperation (co-optation?) with the PRI regime. See Roger Bartra, *Blood, Ink, and Culture: Miseries and Splendors of the Post-Mexican Condition,* trans. Mark Alan Healey, (Durham: Duke University Press 2002); and Claudio

In 1974, kidnappers abducted Echeverría's eighty- three year old father-in-law, the former governor of Jalisco, Jose Zuno Hernandez. The captures demanded $1.6 million and the release of ten political prisoners. The president's wife Maria Zuno de Echeverría and her brother Vicente Zuno worried about their father's care. He was diabetic and suffered from a heart blockage. Attorney General Pedro Ojeda Paullada announced that the government refused to negotiate, while Vicente Zuno blamed American imperialists, especially the Rockefeller Foundation and the Ford Foundation, "for whipping up a spirit conducive to such a crime."[15] The victim's son exhorted, that it was "Yankee imperialism that causes anarchy in the social and political structures in developing countries such as Mexico."[16]

Zuno Hernandez was released on September 8, 1974, on the same day that the Mexican Army inflicted numerous casualties in a firefight to rescue Senator Ruben Figueroa, who had been held for four months. Zuno Hernandez was held for ten days before he was dumped on a street corner in Guadalajara. He was hungry, but reported that he had been treated well and given his diabetes medication. He said that his captors were "clean-living boys, good boys, but they're mixed up." He talked philosophy with his kidnappers and told them that the C.I.A, not the Mexican government, was their real enemy.[17] At a press conference, Zuno Hernandez praised the guerrillas who had released him and attacked Echeverría and his administration. He claimed that his son-

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Lomnitz, *Deep Mexico, Silent Mexico: An Anthropology of Nationalism,* (Minneapolis, University of Minnesota Press, 2001).

[15] "'No Deals' for Mexico Chief's Kidnapped Kin," *The Chicago Tribune,* 30 August 1974, A7.

[16] Vicente Zuno, quoted in "Mexico Bars Deal with Group Holding Kinsman of President," *The New York Times,* 30 August 1974, 3.

[17] "Mexican Senator Freed in Shootout," *The Washington Post,* 9 September 1974, A5.

in-law had "let [himself] come under control of the reactionary forces of the world."[18] As the kidnappings and guerrilla violence spread, clearly indicating that Echeverría could not appeased the students or the leftist opposition, he shifted his populist priorities by focusing on rural development, informed by environmentalist concerns, and on challenging the United States over the water quality of the Colorado River as it crossed the U.S. - Mexico border.

Agrarian Populism

As early as 1972, Echeverría began challenging the American dominance of the Mexican economy. He stated that "[t]here can be no equal treatment among unequals," and he announced that Mexico would "give special treatment …to Latin American nations."[19] In a visit to the United States, he questioned how Richard Nixon could extend cordial relations to the Soviet Union and communist China while ignoring problems closer to home. Echeverría found it "impossible to understand why the United States does not use the same boldness and imagination that it applies to solving the problems with its enemies, to the solution of simple problems with its friends." Even as U.S. Secretary of State William Rogers and Mexican Foreign Minister Emilio Rabasa signed several agreements to promote scientific and technical exchanges, Echeverría began calling attention to the challenges facing the two nations regarding the Colorado River, which crossed the U.S. - Mexican border carrying silt, salt, and contamination

[18] Jose Guadalupe Zuno Hernandez, quoted in "Freed Mexican Criticizes Kin's Rule," *The New York Times,* 9 September 1974, 3.

[19] Luis Echeverría, "Reflections By President Luis Echeverria," *The Washington Post,* 15 June 1972, AS4-5.

from farmers in Arizona. Echeverría called the contamination of the waters "an unacceptable form of discrimination" against Mexican farmers.[20]

Water issues dominated Echeverría's administration. Immediately upon taking office, Echeverría drew upon the precedent established by the Constitution of 1917 in order to extend federal government control over water as a subsoil resource similar to petroleum. In February 1971, he pushed a law through Congress that would allow the state to compel private landowners to distribute water more equitably to small farmers.[21] In many ways, government intervention still favored large-scale agribusiness, but Echeverría's campaign over water proved to be one area in which he was able to establish some populist credibility. According to a historian of the western United States, at least part of his popular support in northern Mexico involved his willingness to confront the United States over the salinity of water from the Colorado River, which irrigated an agriculturally productive region around Mexicali. According to treaty obligations from the 1940s, the United States was required to provide Mexico with a one and a half million acre-feet of water in order to irrigate agricultural fields just south of the border. However, when the Wellton-Mohawk irrigation project began diverting waters at the Imperial dam in 1961, and the U.S. Bureau of Reclamation built the Glen Canyon Dam in 1963, the natural flow of the Colorado River could no longer flush away silt and the salinity of river increased dramatically. The Wellton-Mohawk project was particularly

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[20] Luis Echeverría, quoted in Terry Shaw, "Mexican President Cautions U.S. to Remember 3d World," *The Washington Post, Times Herald,* 16 June 1972, A1, A4. Luis Echeverria, "Mexico's President on U.S.-Latin American Relations." CQ Press Electronic Library, Historic Documents Series Online Edition, hsdc72-0001191560. Originally published in *Historic Documents of 1972* (Washington: CQ Press, 1973). http://library.cqpress.com.ezproxy.lib.ucf.edu/historicdocuments/hsdc72-0001191560 (accessed October 1, 2010).

[21] Barry Bishop, "More Water Rule Eyed By Mexico," *The Chicago Tribune,* 22 February 1971, A7

damaging. In the dry desert region of southwest Arizona, water was drawn from deep wells and used to irrigate commercial farms. As surface water evaporated in the high heat, the drainage that seeped back into the Gila River through a network of canals contained extremely high saline concentrations. The salty water then poured into Mexico after the Gila River met the Colorado River just north of the border.[22] The water that ultimately arrived in Mexico had such a high saline content that it ruined Mexican agricultural lands.

Throughout the 1960s, American officials confirmed their treaty obligations to provide water to Mexico, but claimed that the salty water was still suitable for agriculture. By the early 1970s, however, as Mexicans exported more produce to the United States and failed Mexican farmers increasingly traveled north for work, the Mexican Minister of Hydraulic Resources, Leandro Rovirosa Wade, claimed that water was far too salty to drink or irrigate Mexican fields. He argued that the Colorado River naturally carried 900 parts per million of soluble salts, and that it was always near the limit of what was usable for irrigation. Agronomists suggested that anything above 600-800 parts per million could adversely affect agricultural production.[23] With the increased salinity and contamination from American agriculture, the water completely ruined Mexican farms. In the June 1972 meeting with Nixon, Echeverría made the salinity of the Colorado River a primary concern and presented several possible solutions. He suggested that the United States and Mexico could jointly finance and construct a canal to carry the salty water to the Gulf of California, while the United States paid reparations

[22] Marlise Simons, "American Salt in the Mexican Earth," *The Washington Post, Times Herald,* 23 July 1973, B4.

[23] James Nelson Goodsell, "'Salty' Colorado Erodes U.S.-Mexico Relations," *The Christian Science Monitor,* 15 June 1972, 4.

to Mexican farmers. He then authorized Mexicans to construct more than 100 wells in an attempt to siphon off the contaminated waters.[24] Echeverría also wanted the United States to remove a ten percent tariff on import goods that had gone into effect the previous year in order to increase trade in Mexican fruits, tomatoes, strawberries, and cotton.

The Mexicali Valley had been a cotton-producing region in which farms were organized into commercial *ejidos* following the Mexican Revolution. Felipe Moreno, a resident from an *ejido* called "Jalisco," recalled how people traveled from across the country and fought for land that could easily produce $5,000 of profits each year from cotton. By the late 1960s, *ejido* residents began experimenting with different crops, including wheat, safflower, and alfalfa. By the early 1970s, many had abandoned their lands and sought work elsewhere, or went further into debt with the Agrarian Credit Bank just to survive. Moreno, himself, was resigned. As he explained, "'I don't even ask anymore how much I owe … I just keep hoping they'll lend me some more the next time.'" He complained that salt had not only destroyed the soils, producing patches that looked like blankets of snow across the earth, the saline also corroded his tractor.[25]

Nixon administration officials agreed to an interim solution whereby the United States would drain off half of the highly concentrated waters from the Wellton-Mohawk project and replace it with fresh waters from the Imperial Dam Reservoir, reducing the salinity from 1,250 parts per million to 1,150 parts per million. Echeverría agreed to commit $12 million to rehabilitate lands or relocate farmers, but complained that the

[24] Richard Severo, "Colorado River Salt Annoys Mexicans," *The New York Times,* 11 June 1972, 6.

[25] Simons, "American Salt," B4.

half-hearted measures did little to solve the problem.[26] He threatened to hold the United States accountable before the World Court in The Hague until U.S. officials finally agreed to a salinity control treaty. In 1973 and 1974, former U.S. Attorney General Herbert Brownell negotiated a treaty with the Echeverría administration. Typical of conservationist thinking of the era, American and Mexican officials proposed technological solutions to environmental problems. The U.S. Congress agreed to fund a massive reverse-osmosis desalination plant, at a cost of $300 million, to clean the Colorado River just as it crossed the border with Mexico. Boosters claimed that the desalination plant would not only improve U.S.–Mexican relations, it would also be an experiment in the large-scale applicability of the reverse osmosis techniques that would prove to be a "boon for companies in the field, including Du Pont, co.; General Tire and Rubber Co.'s Aerojet -General Corp.; Monsato Co.; Gulf Oil Corp.; Westinghouse Electric Corp. and Sybron Corp."[27] By 1973, the concentration of salt in the Colorado River waters that flowed across the Mexican border approached 3,000 to 4,500 parts per million. The proposed desalination plant was ten times larger than any other in the world, and it would consume enough electricity to meet the demands of an urban population of forty thousand people.

The U.S. Congress approved the plan on July 1, 1974, and Brownwell reached an agreement with the Mexican government by late August. However, the plant would not be completed until 1978.[28] Environmentalists criticized the plan and suggested an

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[26] Simons, "American Salt," B4.

[27] Burt Schorr, "U.S. Plans World's Biggest Desalting Plant To Clean Colorado River Water For Mexico," *The Wall Street Journal,* 4 June 1973, 10.

[28] "U.S. Agrees to Desalt Water Diverted to Mexico," *The New York Times,* 31 August 1973, 23.

alternative approach. They argued that the U.S. government could buy out the lands of farmers in the Wellton-Mohawk region and retire them from production. Critics claimed that the land was in a desert region, like so much of the southwestern United States, and that it should never have been considered for agriculture in the first place.[29] Agriculture only existed there as a result of costly irrigation projects and was directly responsible for leeching salts into the groundwater, and ultimately into the Colorado River as it crossed the Mexican border.[30] Echeverría ignored the environmentalists' concerns, but he proved to be sensitive to the political advantages of deploying a language of environmental stewardship.

By the 1970s, awareness of environmental problems and the consequences of development had captured the imagination of scholars, activists, and politicians throughout the world. The first Earth Day was celebrated on April 20, 1970. In the United States, the Republican administration of Richard Nixon attempted to assuage popular pressure by proposing and signing into law sweeping environmental protection legislation that established the federal Environmental Protection Agency. Officials from the United Nations also recognized the consequences of environmental degradation. Scholars have argued that Mexican officials responded to such international movements in complex and often contradictory ways. When Echeverría assumed the presidency in 1970, he offered the nation the prospect for meaningful reforms, including environment reforms. According to one commentator, Echeverría proposed environmental reforms

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[29] The disastrous consequences of developing the arid regions of the United States have been chronicled in the classic work of environmental history, Donald Worster, *The Dust Bowl: The Southern Plains in the 1930s,* (Oxford: Oxford University Press, 1979).

[30] Marc Riesner, *Cadillac Desert: The American West and Its Disappearing Water,* rev. ed., (New York: Penguin Books, 1993), 7-8, 463-464; Bill Curry, "The Desert Blooms, But At An Ever Higher Price," *The Washington Post,* 25 July 1979, A3.

"principally because he feared that the severity of environmental problems in Mexico would result in [the same sort of] political and social unrest" that had led to the Tlatelolco Massacre.[31]

Echeverría followed others around the world in recognizing the severity of environmental degradation, but he resisted international pressures. Instead, he sought to find uniquely Mexican solutions the problem of sustaining development while still promoting a degree of environmental conservation. He claimed that "the man of our times seems to have forgotten that his existence depends on an equilibrium [with] the physical environment which [can] all too easily be upset." Yet, he insisted that "the serious problems generated by pollution should not be translated into measures that would diminish aspirations to economic progress by peripheral nations."[32] Echeverría blamed multinational corporations for Mexico's environmental degradation, though he neglected the fact that many corporations only invested in Mexico because of its lax environmental regulations and government subsidized public works projects. He argued that industrialized nations deliberately tried to hinder economic growth in the developing world by forcing those countries to adopt more severe environmental legislation. Though, he did express concerns about industrial pollution in Mexico and enacted the first anti-pollution legislation in Mexican history, he favored technological solutions that he hoped would also stimulate industrial and scientific innovation. According to his undersecretary of environmental improvement, Francisco Vizcaíno Murray, Echeverría had accomplished a "true revolution" by curbing pollution without crippling industrial

[31] Lane Simonian, *Defending the Land of the Jaguar: A History of Conservation in Mexico,* (Austin: University of Texas Press, 1995), 178.

[32] Echeverría, "Reflections," AS5.

development. However, later commentators provide a more mixed assessment of the environmental achievements of the early 1970s.[33] Ultimately, Echeverría's concern with populist reforms committed the administration to a program of rural development in which indigenous *campesinos* were displaced by large irrigation projects and modern agricultural techniques depleted natural resources.

Initially, Echeverría attempted to alleviate industrial pollution in Mexico's industrial centers by promoting incentives for manufacturers to move into agricultural areas. He divided Mexico into three zones. The first included the main industrial areas around Mexico City, Guadalajara, and Monterrey. The second zone included cities, such as Cholula and Queretaro, which already had some industry but offered advantages for new businesses or manufacturing companies looking to relocate. Zone three consisted of the rest of rural Mexico. For companies that opened new factories in the rural areas of Mexico, the federal government provided ten to forty percent reductions in income taxes, total exemptions from import duties on tools and machinery, reduced interest rates on banks loans, and elimination of capital-gain taxes on the sale of industrial lands.[34] While such a plan could potentially mitigate some of the congestion and air pollution of industrial areas like Mexico City or Monterrey, it promoted more pollution in the rest of the country and it would require a commitment from the federal government to build roads and infrastructure, which would increase pollution from transportation to isolated rural areas. Such policies went against one strain of environmental thinking that began to gain traction in the early 1970s. In the

[33] Simonian, *Defending the Land of the Jaguar,* 178-182; Vizcaino Murray, *La contaminación en Mexico*, (Mexico City: Fondo de Cultura Economica, 1975), 20.

[34] C. Conrad Manley, "Mexico Accelerates Plan to Decentralize Industry," *The Christian Science Monitor,* 17 August 1972, 4.

suburbs of the United States, for example, new construction projects favored tightly clustered developments in an effort to preserve green space and wildlife habitats.[35]

While Echeverría tried to make significant strides to curb pollution in the capital, he promoted development, and pollution, in other parts of the country. Echeverría and the Minister of Hydraulic Resources, Leandro Rovirosa Wade tapped engineer Jorge L. Tamayo to take control of the moribund Papaloapan Commission that had limped along through the 1960s as federal funds were diverted to irrigation projects in the north. With renewed enthusiasm, the federal government promised $320 million to the construction of a new dam, The Cerro de Oro dam, to control floodwaters and provide a source of irrigation for commercial farmers in the Papaloapan Basin. Echeverría evoked Mexican law that had previously been employed to expropriate hacienda land after the Revolution, and laid claim to lands belonging to 4,000 Mazatec and Chinantec families living in a section Oaxacan highlands that was scheduled to be flooded by the Cerro de Oro's reservoir. Government officials allocated $25.5 million to resettle the displaced groups among 6000 acres of virgin forest in the Uxpanapa Valley.[36]

Echeverría in Papalaopan

When government officials first tackled the narrowly construed problem of controlling flooding in the Papaloapan Basin during the 1950s, they originally planned

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[35] See Adam Rome, *Bulldozer in the Countryside: Suburban Sprawl and the Rise of American Environmentalism,*(Cambridge: Cambridge University Press, 2001). Though, of course, racial and class considerations often determined where those industrial clusters were located and spurred debates over environmental justice as working class and black communities often faced the worst industrial and environmental pollution. See Robert D. Bullard, *Dumping in Dixie: Race, Class and Environmental Quality,* 3rd ed., (Boulder: Westview Press, 2000); Andrew Hurley, *Environmental Inequalities: Race Class and Industrial Pollution in Gary, Indiana, 1945-1980,* (Chapel Hill: University of North Carolina Press, 1995).

[36] Conrad Manley, "Mexico Relocating 400 [sic] Families in Wilderness; Homeland to be Flooded," *The Christian Science Monitor,* 27 February 1974, 3.

on constructing two dams to harness the river's waters. However, the showcase of early designs, the Cerro de Oro dam, had not yet been built. Lower construction costs dictated that the Papaloapan Commission officials should have begun with the construction of the Miguel Alemán dam in the late 1940s and 1950s, but waning enthusiasm, declining budgets, and increasing opposition kept engineers from moving forward with plans for the construction of the second dam, the Cerro de Oro, on the Rio Santo Domingo. However, while the construction of the Miguel Alemán dam led to increased commercial agricultural development in the coastal plains of Veracruz, it did little to address the problem of seasonal flooding that had initially inspired government officials to intervene in the region. Floods in 1958 and 1969 and heavy rainfall from a Gulf hurricane damaged the commercial enterprises in Veracruz and compelled landowners to renew pressure on the federal government to build the Cerro de Oro dam.[37]

In 1972, the Echeverria administration committed to rural development and charged the Papaloapan Commission with constructing the Cerro de Oro dam and creating a single reservoir, connected to the artificial lake created by the Miguel Alemán dam, to form the largest man-made lake in Latin America. The reservoir would cover 700 square kilometers and hold a volume of 13 billion cubic meters of water, but planners anticipated that it would protect lowland farms in an area covering 210,000 hectares. However, because the dam could only hold a maximum capacity of 568 million cubic meters of silt, critics charged that deforestation and erosion from the

[37] Peter T. Ewell and Thomas T. Poleman, *Uxpanapa: Agricultural Development in the Mexican Tropics,* (New York: Pergamon Press, 1980), 68-72.

Oaxacan highlands reduced the dam's useful life to only sixty years.[38] Officials responded that the Papaloapan Commission had always been committed to developing the region as an integrated unit, and that re-forestation projects in the highlands would mitigate the problem of erosion and reduce the amount of silt collected behind the dam, thereby extending its useful life long enough to justify construction costs. Though, as one observer noted, "the fundamental purpose of the dam was to protect the investments already made in the lower basin."[39]

Government officials drew upon a discourse of the tropics to buttress arguments about flood control. In the presidential decree authorizing the construction of the Cerro de Oro dam, Echeverría stressed that the public works projects were necessary to "increase both the production and the income of the people, and … [to] permit this region to be integrated into the national economy." His arguments and proposals mirrored those of an earlier era in that they focused on increasing agricultural production (a puzzle which scientists and engineers could solve). Echeverría emphasized the importance of bringing to heel the wilderness of an impenetrable tropical region for the good of the *campesinos* and the nation. To reinforce the connections among development in the tropics, the indigenous people of the south, and the nation, Echeverría highlighted the "importance of initiating projects in the State of Oaxaca as a tribute to President Benito Juarez," the Zapotec Indian who became a hero

[38] Sara J. Scherr and Thomas T. Poleman, *Development and Equity in Tropical Mexico: Thirty Years of the Papaloapan Project,* (Ithaca, NY: Department of Agricultural Economics, 1983), 43-44; Ewell and Poleman, *Uxpanapa,* 72.

[39] Victor Ahuja Bravo, Jorge L. Tamayo, and Antonio Jimenez Puya, *Informe de la Junta Especial de Estudios Relativo al Desarollo Socio-economico de la Parte Alta de la Cuenca del Rio Papaloapan,* (Mexico City: 1972); Ewell and Poleman, *Uxpanapa,* 73.

and a national symbol during the liberal wars of the nineteenth century. [40]

The discourse of backward people inhabiting a fecund, but underutilized tropical nature demanded that a series of other public works be constructed to compliment the flood control projects associated with the Cerro de Oro Dam. Echeverría decreed that the Papaloapan Commission would also oversee construction of canals and levees to increase the capacity of the Papaloapan River, soil conservation programs in the upper basin, roads, schools, post and telegraph offices, health centers, and sewage facilities.[41] Through the 1960s, shrinking government budgets forced the Commission either to abandon such endeavors, or to rely on private sector partners to complete the construction of smaller projects. However, as increasing agricultural production in the tropical region again became a national priority, the federal government favored an approach that integrated development of the entire region under the auspices of the Papaloapan Commission. The Commission also managed the indemnification and resettlement of commercial farmers and *campesinos* affected by the projects. Private property owners sent representatives from the Farmers Association, The Cattle Ranchers Association, and an Association of Private Property Owners to negotiate with the Papaloapan Commission. They reached an agreement so that landowners would be compensated either in cash, according to a valuation of their holdings undertaken by the Commission, or in land in other areas. Property owners could receive up to twenty hectares of irrigated land or 250 hectares of pasture land. For the Mazatec and Chinantec Indians displaced by the reservoir, Echeverría promised that they would

[40] Luis Echeverría, "Appendix-Abridged Translation of the Executive Decree of August 29, 1972, Which Authorized the Construction of the Cerro de Oro Dam," in Ewell, *Uxpanapa*, 185.

[41] Echeverria, "Appendix" 186.

receive, as *ejidos,* ten hectares of irrigated land or twenty hectares of rain-fed land in the jungles of Uxpanapa.[42]

To provide twenty hectares of land for each if the 4,000 families that would be affected by the dam, the Commission needed to find 80,000 hectares that were suitable for agriculture, but not already in production. By the early 1970s, however, much of the southern frontier had already been settled by cattle ranchers and the best agricultural lands in the traditional Chinantec homelands were scheduled to be flooded. Both the Commission officials and the Chinantec Indians remembered the failed relocation schemes in Las Naranjas in the 1950s, and the Commission sought a meaningful collaboration with leaders of the fifty-one *ejidos* that would be negatively affected by the dam.[43] Chinantec delegates accompanied Commission officials in the search for suitable lands for resettlement. The *ejiditarios* wanted to remain close to their traditional homelands, but Commission officials favored virgin forest sites in the Uxpanapa Valley in the Isthmus of Tehuantepec. The area had previously been divided into *ejidos* in the 1960s, but few settlers occupied the land and it remained under federal jurisdiction. To promote the dense jungle location, the Commission paid for transportation expenses so that community leaders could inspect it for themselves. However, the topography and climate allowed only a superficial survey of the area. Most official visitors traveled on small launches up the rivers and canals, though some flew in helicopters to forest so dense that a man had to be "lowered on a rope to cut out a landing space with his

[42] *Diario Official,* vol. 313, No. 54, 30 August 1972, in Ewell, *Uxpanapa,* 187-188.

[43] Some *ejiditarios* chose not to relocate. They preferred to organized cooperatives along the shores of the reservoir to exploit resources from fishing and harvesting tree fruits.

machete."[44]

The sites in the Uxpanapa Valley were in dense tropical rainforest and lacked basic services and infrastructure. The government had begun construction on a road to Tuxtepec, Oaxaca and Ojitlan, Veracruz, but the relocation sites remained isolated and far from the Chinantec homeland in the highlands of Oaxaca. As community leaders objected, the Papaloapan Commission offered alternative relocation sites in the regions of Las Naranjas, where the relocations of the 1950s had previously failed. Despite the well-known disadvantages, those sites appealed to some because they were closer to the Oaxacan highlands. Community leaders divided and many protested the construction of the dam and the resettlement schemes. However, in the end, twenty-eight *ejidos* representing 2,796 families chose to relocate to Uxpanapa, while nine *ejidos* representing 946 families chose Las Naranjas, and fourteen *ejidos* chose to remain and organize fishing, cattle, or tree crop cooperatives along the reservoir shores once the dam was finally constructed.[45]

A more critical reading of these events suggests that the final choice of a resettlement zone involved the resolution of multiple contestations and negotiations. Where advocates saw a genuine collaboration between the Papaloapan Commission and community leaders, critics saw a move away from the "openly dictatorial" policies of the 1950s toward a more "subtle manipulation."[46] Where the Papaloapan Commission

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[44] Ewell, *Uxpanapa*, 88.

[45] Secretaria de Agricultura y Recursos Hidraulicos, Comite de Reacomodo, Presa Cerro de Oro, 1976, Tercer Informe, Mimeo, in Ewell, *Uxpanapa,* 89.

[46] Alicia Barabas and Miguel Bartolomé, *Hydraulic Development and Ethnocide: The Mazatec and Chinantec People of Oaxaca, Mexico,* (Copenhagen: International Work Group for Indigenous Affairs, 1973), 10.

saw the opportunity to conquer and settle a tropical frontier, others noted a conspiratorial accommodation with entrenched landowners. As governmental officials promoted a variety of options, observers witnessed disputes among competing powerbrokers. While supporters championed local democracy, scholars could see one faction consolidate its victory over local rivals in a process of establishing communal hegemony.[47]

Many people refused the government's resettlement scheme and protested the dam's construction. In 1973, several engineers from the Papaloapan Commission perished in an airplane crash. Five years later, the two leaders of the Commission, Engineers Jorge I. Tamayo and Guillermo Hernandez Castro died in a helicopter crash. Their deaths delayed the publication of thirty-year retrospective of the Commission's triumphs and generally sapped the remaining enthusiasm for the Commission's mission in the tropics.[48] Some Chinantecas believed that God had sent his own engineers to argue against new construction projects, and that the deaths were punishment for disobeying God's will. Others claimed that the Devil had appeared at the proposed site of a new dam, the Cerro de Oro. The Devil warned the engineers and government officials to leave and called on President Echeverría to come to the Oaxaca highlands in order "to settle accounts."

Community leaders in the provincial town of Ojitlan ordered shamans to persuade their companion spirits to attack and kill Echeverría. According to local rumor, the president only escaped his fate by mobilizing his own, more powerful, spirits. In

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[47] See Florencia Mallon, *Peasant and Nation: The Making of Postcolonial Mexico and Peru,* (Berkeley: University of California Press, 1995), 11-12.

[48] Scherr and Poleman, *Development and Equity in Tropical Mexico,* i-ii.

December 1972, the Virgin of Guadalupe, the syncretic symbol of the *mestizo* Mexican nation, appeared on a hill opposite the proposed site of the Cerro de Oro dam. The apparition of the Virgin requested an audience with the president and community leaders to mediate the disagreement and to argue against the construction of the dam. Thereafter, a cult developed around a sacred piece of wood found at the site of the Virgin's appearance. The hill became a pilgrimage site and Chinantec community leaders carried the sacred pieces of wood in front of processions of hundreds of people.[49]

In addition to protests from local peasants, the Papaloapan Commission faced competition over jurisdiction from other governmental bureaucracies, including the Department of Agrarian Affairs and Colonization (DAAC), the Secretariat of Hydraulic Resources (SHR), from aspiring national political parties like the Authentic Party of the Mexican Revolution (PARM), and peasant organizations like the National Confederation of Peasants (CNC) and the Independent Confederation of Peasants (CCI). The PARM fought for control over the municipal authorities and accused PRI officials of misconduct, while the SHR pressed to relocate Chinantec Indians into irrigated lands so that they might directly enjoy the benefits of dam construction, instead of being forced into rain-fed areas of the Uxpanapa Valley, which would only allow commercial farmers access to the irrigated waters. Critics claimed that mediators from the Papaloapan Commission tried to destroy the authority of Chinantec elders who resisted resettlement schemes by undermining *cofradia* cargo systems that structured local community hierarchies, as

[49] Alicia Barabas and Miguel Bartolomé, *Hydraulic Development and Ethnocide: The Mazatec and Chinantec People of Oaxaca, Mexico,* (Copenhagen: International Work Group for Indigenous Affairs, 1973), 15.

rumors swirled and obscured the specifics of the Commissions designs and the resettlement plans.[50]

Despite the ultimate construction of the Cerro de Oro dam and the relocation of approximately 20,000 Chinantec Indians from the Oaxacan highlands to the tropical lowlands of Tehuantepec, the Papaloapan Commission's continuing efforts to bring tropical nature and tropical peoples into a national development scheme faced new obstacles. The political and intellectual climate had changed. In addition to student protests against the Echeverría regime, new scientific and intellectual arguments challenged to underlying assumptions that guided government development projects. Both the construction of the Cerro de Oro dam and the resettlement schemes faced mounting opposition in the early 1970s as new conceptions of indigenous rights and environmental stewardship mobilized a broad range of activists. Mazatec and Chinantec community leaders allied with a new generation of anthropologists and environmentalists, agronomists and ecologists, tourists and travelers. Together, these disparate groups articulated an alternate notion of rural agriculture based on local indigenous land and water use practices that they believed would not only preserve the fragile relationship between peasant cultures and the natural world, but also increase agricultural productivity over the long run by avoiding the pitfalls that plagued "modern" agriculture technologies.

As in the 1950s, the government officials commissioned a series of studies to make Chinantec culture legible to policy makers and facilitate the transition to "modern" agriculture and assimilation into the national vision. In the 1950s, the scholars who

[50] Barabas and Bartolomé, *Hydraulic Development and Ethnocide,* 10-11.

worked with the Commission and the National Indigenous Institute (INI) shared the same goals and visions of regional development and acculturation. The anthropologists who served as advisors in the 1970s, however, attacked the Commission's agenda and criticized its methods.[51] Alicia Barabas and Miguel Bartolomé worked as field researchers for the *Instituto Nacional de Antropoligía e Historia* (INAH) and acted as advisors to the Papaloapan Commission. They were supposed to conduct studies "with the fundamental political intention of persuading the Indian of the inevitability of change." Such studies were required by the World Bank, which supplied forty percent of the financing for the construction of the Cerro de Oro dam. However, the anthropologists challenged their government colleagues, none of whom suggested that the dam should not be built, "for the sake of the Chinantecs."[52]

Instead, Barabas and Bartolomé submitted their findings to the International Work Group for Indigenous Affairs in Copenhagen, Denmark. They claimed that, since their inception, the Papaloapan Commission and the *Insituto Nacional Indigenista* (INI) promoted a consistent program to eradicate indigenous culture and promote assimilation of, first, the Mazatecs displaced by the Miguel Alemán dam and, then, the Chinantecs scheduled to be resettled with the construction of the Cerro de Oro dam. The anthropologists claimed that the intent of the INI and the Papaloapan Commission has been "to relieve the Chinantec, once and for all, after four hundred years of conquest and domination, of the burden of maintaining their own language, a coherent system of social and kinship organization, and an integrated relationship with [the]

[51] And like Carl Sauer's advice to the Rockefeller Foundation in the 1940s, their recommendations were promptly ignored by government officials.

[52] Barabas and Bartolomé, *Hydraulic Development and Ethnocide,* 13.

cosmos."[53] Critics argued that resettlement would provoke psychological depression, generational conflict, and an exploitative relationship whereby peasants would be vulnerable to predations of informal money lenders who would intervene between vulnerable communities and the suppliers of "modern" agricultural technologies like hybrid seeds, chemical fertilizers, and pesticides.[54]

The ecology of Uxpanapa presented challenges to government planners and Chinantec colonists. Located in the Isthmus of Tehuantepec, the narrow strip of land dividing Mexico from Central America, Uxpanapa represented both the promises of integration, and the challenges of isolation. Observers and government officials had long viewed crossing the narrow isthmus as a way to connect the Gulf of Mexico to the Pacific Ocean. Alexander von Humboldt considered Tehauntepec as a possible site for a canal, and the United States tried to secure rights to a canal zone in the 1840s. During the Porfiriato, the Mexican government divided the lands in the isthmus between timber concessions and land grants to railroad builders. The *cientificos* who advised Porfirio Diaz believed that railroad construction would lead to development in the region, with smallholders settling along the rail lines. However, most of the recipients of the land grants held onto their lands and speculated on the hope that future commercial success would increase the value of their holdings. Others exploited hardwood reserves rather than promoting peasant settlements. During the twentieth century, the state-run oil company, PEMEX, constructed industrial complexes along the Gulf coast, but left much to the region sparsely inhabited.

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[53] Barabas and Bartolomé, *Hydraulic Development and Ethnocide,* 13.

[54] Barabas and Bartolomé, *Hydraulic Development and Ethnocide,* 14.

The pattern of historical development in Uxpanapa reshaped the natural world. Timber operations cleared much of the primary growth forests, reducing the number and variety of plant species. As in other rainforests, most of the nutrients are contained in the biomass, rather than in the soils. Trees stretch vertically to rise above the undergrowth as heat and moisture cause plant matter to decay rapidly. One historian describes a tropical rainforest as "an evergreen battleground." Billions of trees go to great lengths to scatter their seeds and "capture every scrap of nutrient that reaches the forest floor."[55] As a result, tropical regions contain a tremendous variety of biodiversity within a compact area, but the soils are rather thin, making agriculture difficult. Anthropologist Betty Meggers has described similar environments in the Amazon as a "counterfeit paradise" since the lush vegetation promises agricultural productivity, but the lack of soil fertility routinely frustrates attempts at settlement.[56] In the resettlement zones of Uxpanapa, early twentieth-century logging and cattle ranching cleared away primary forests and exposed loose clay soils. In addition, planners and colonists confronted the challenge that sixty percent on the land was mountainous with slopes at a gradient of greater the fifteen percent. Such steep terrain meant that any agricultural activity that required clearing the land ran the risk of promoting erosion of the already depleted topsoil and of washing away any applied chemical fertilizers.[57]

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[55] John Hemming, *Tree of Rivers: The Story of the Amazon,* (New York: Thames and Hudson, Inc., 2008), 339.

[56] Betty Meggers, *Amazonia: Man and Culture in a Counterfeit Paradise,* (Washington: Smithsonian Institution, 1971). The implication of Meggers's findings for early life and population size in the Amazon has come under considerable attack in recent years. Anthropologists and archaeologists, such as Anna Roosevelt, William Denevan and Michael Heckenbegrer, have discovered the variety of ways in which early man utilized river and forest resources. However, her descriptions of the limited fertility of tropical soils remain relevant for the tropical forests of southern Mexico.

[57] Ewell, *Uxpanapa,* 104-108.

Following the Mexican Revolution, the government expropriated the lands in Uxpanapa and attempted to redistribute them as *ejidos.* However, many of the applicants never took possession as much of the land was inaccessible or unsuitable for agriculture due the gradient of the slopes or the aridity of the soil. Nonetheless, *ejidal* claims complicated government efforts to secure the lands for displaced Chinantec resettlement. Further complications arose when spontaneous colonization preceded the efforts of the Papaloapan Commission. By the early 1970s, some 200 families lived scattered among forty isolated settlements. They came from various parts of rural Veracruz and Oaxaca and were connected to the outside world by rivers and forest trails. They largely survived off subsistence agriculture. They were poor, but after only few years of experience they managed to coax substantial yields of maize and rice out to the tropical forest. As one observer noted, their yields "were higher [on] the average than the expensive, mechanized systems introduced by the government were able to achieve." Furthermore, their experiences provided a "valuable perspective on the challenge of introducing extensive agriculture technology into the rainy tropics." The most successful colonies were located along riverbanks where seasonal floods brought alluvial silts to replenish soil nutrients. And, though these earlier settlers stood to benefit from the road building activities of the Papaloapan Commission, they resented the threat to their "hard-earned independence" and they believed that improving their traditional methods could be more productive than adopting modern agricultural technologies.[58]

The Papaloapan Commission focused on using hybrid seeds, chemical fertilizers

[58] Ewell, *Uxpanapa,* 112-116.

and pesticides, mechanization and centralized planning by experts. Each displaced Chinantec family received twenty hectares of land but was organized into *ejidos.* Each *ejido* sent a representative to Union of Ejidos, but ultimately the Papaloapan Commission made crucial decisions regarding the allocation of resources, such as machinery, fertilizer, and seeds. Planners believed that centralizing decisions allowed the Commission to coordinate production with the needs of national markets and to implement practices according to the results of scientific experimentation. Commission officials also coordinated the finances of the Uxpanapa colony. They established an official bank to collect any profits from commercial agricultural enterprises. *Ejiditarios* could then apply for short-term loans to cover operating expenses. Planners assumed that centralizing the marketing and sale of agricultural commodities would allow the colonists to take advantage of economies of scale. However, the colonists could have pooled their resources through the Union of Ejidos without the overarching layer of government bureaucracy. As it was, *ejiditarios* had to go into debt and pay interest to gain access to their own profits because government officials could not trust them to manage their own affairs.

For planners from the Papaloapan Commission, the colonization scheme at Uxpanapa had a number of advantages. First, it allowed them to relocate the displaced Chinantec Indians to lands that were not already held by entrenched interests. Second, it gave them the opportunity to extend the reach of the state into a tropical region that had resisted colonization since the colonial period. And finally, Papaloapan Commission officials viewed the resettlement project, explicitly, as an “opportunity to develop modern agricultural enterprises under the direct control of the state, organized through collective

ejidos."[59] The construction of the Cerro de Oro dam and the resettlement of Chinantec Indians brought together all of the threads that had defined the Mexican state-building project of the postwar period. It extended the reach of the state into the hostile tropics. Because it was coordinated through the state bureaucracy rather than through collaboration with the private sphere, it allowed planners to implement the findings of scientific experts while claiming sensitivity to newer environmentalist concerns. And yet, by organizing the Chinantecas into *ejidos*, it allowed the Echeverría administration to evoke the agrarian populism of the Cárdenas era.

Ecologists objected to the development plan for the tropical colony in Uxpanapa. Though the Echeverría administration and its scientific advisors claimed to be sensitive to environmental concerns, environmentalists objected to many of the government's schemes. They argued taking desert lands out of agricultural production could solve the problem of high salt concentration in the Colorado River better than a costly desalination plant. Activists opposed the administration's efforts to alleviate industrial pollution in the major cities by expanding into the Mexican countryside. Ecologist and anthropologists opposed the construction of the Cerro de Oro dam, which displaced Chinantec Indians while destroying a rich ecosystem for a dam whose useful life was reduced by the accumulation of silt from highland erosion. With the opposition to the settlement scheme in Uxpanapa, the outlines of a discourse of nativist environmentalism, which condemned modern agricultural techniques and championed local, indigenous adaptations, began to take shape.

The Papaloapan Commission sponsored academic environmental studies of the

[59] Ewell, *Uxpanapa,* 121-123.

resettlement zone in Uxpanapa. By the 1970s, however, planners from the Papaloapan Commission could draw upon decades of research into the hybrid seeds and new technologies developed by the Rockefeller Foundation, though Commission scientists sought to apply the modern agricultural practices to the humid tropics. They emphasized that the resettlement project needed to be done quickly so that construction could begin on the Cerro de Oro dam, and saw little need for the kind of extensive studies that had accompanied earlier developmentalist programs. For Commission officials, tropical nature was not only already legible, it could easily be conquered. The plaque above the entrance to the Uxpanapa colony read, "We Will Be Realists and Do the Impossible." The modern agricultural practices pioneered by the Rockefeller Foundation had become a new orthodoxy among government scientists and planners.

The Papaloapan Commission focused on using hybrid seeds developed by the Rockefeller Commission in temperate climates to develop commercial agriculture on the *ejidos* in Uxpanapa. In particular they tried to promote commercial production of rice and maize. Planners compelled Chinantec colonists to produce the first commercial crops of the hybrid Sinaloa A-68 rice on 810 hectares in 1975. The first year's crop was lost entirely because the Commission could not transport enough combine harvesters into the region. In 1976, the Commission reduced the area under rice cultivation by 50 percent as the rushed application of pesticides and herbicides failed to prevent attacks from tropical pests, weeds, and plant pathogens. Additionally, the state devalued the Mexican peso in 1976 and implemented price controls on basic grains designed to control inflation in the urban centers. For colonists and Commission planners in Uxpanapa, the state's anti-inflationary measures meant an increase in the cost of

imputs and limits on the value of their agricultural production. In response, *ejido* leaders refused to plant rice and shifted their focus to subsistance production. Observers worried that the Commission would move away from collaboration with *ejido* leaders and that "the collective *ejido* will no longer be the basic unit of production in [the agricultural colony of] Uxpanapa."[60]

The Commission's attempts at maize production in the southern tropics also faced difficulties. Planners insisted that *ejidatarios* cultivate the hybrid varieties H-503 and H-507 that had been developed by the Rockefeller Foundation. H-503 was a dwarf variety that the Commission abandonded after one season, and H-507 proved to be susceptible to pests. With H-507, the leaves of the corn husk did not close completely to envelope the ear. While that defect was relatively benign in the temperate or arid climates of northern Mexico, it proved disasterous in the southern tropics, as it allowed excess moisture and insect larvae to devour the maize kernels. By 1978, the Commission was forced to "buy native varieties . . . from the spontaneous settlers in the hopes that they would be better adapted to local conditions," but the colonists and planners, alike, worried that the yields would be too low to recoup the costs of production and it remained "uncertain whether maize would ever be economically viable in the region."[61]

As the long-term consequences of modern agricultural development became apparent by the 1970s, botanists and ecologists associated with the Biology Institute at UNAM, the Autonomous State University of Veracruz in Xalapa, and the Eco-

[60] Ewell and Poleman, *Uxpanapa,* 147-155.

[61] Ewell and Poleman, *Uxpanapa,* 155-159.

Development Center of the CONACYT (Mexico's equivalent of the National Academy of Science) began to challenge the dominant developmentalist paradigm. They favored small-scale development that was less disruptive to local ecosystems and was based on proven traditional agricultural practices. Prior to resettling Chinantec families, the Papaloapan Commission sponsored a study conducted by a group of biologists led by Dr. Arturo Gomez-Pompa of UNAM and the Field Museum in Chicago. Gomez- Pampa and his team suggested that traditional agricultural practices were, by definition, well-adapted to the tropical environment and made more effective use of the available natural resources, without depleting the soils or promoting deforestation and erosion. They found the primary and secondary forests, along with the rivers, provided settlers with 299 different species of plants, birds, mammals, insects, fish and reptiles that they could exploit commercially or for basic subsistence. By comparison, built environments centered on sedentary villages, garden plots, and mono-cropped fields provided only 124 different species for *ejiditario* survival. While such data fail to indicate the volume of production and the profitability of each species, they suggest a significant loss of biodiversity and changes to the local ecosystem. Instead, the Gomez-Pompa group recommended working with *campesinos* to develop environmentally-friendly crops. He suggested harvesting a type of tree called *ojite* that lowland Mayans had used for centuries for its hardwood and fruits, which contained significant amounts of protein and Vitamin C. They also suggested that *campesinos* could exploit the bamboo stands that grew in the depleted soils left by the early twentieth-century timber industry. They believed that the Papaloapan Commission was short-sighted and foolhardy for trying to apply technologies developed in temperate zones to produce alien grain crops in the

rainy tropics. They also protested that the Chinantecs had to defer to the central planning committee and were prevented from applying their traditional knowledge.[62]

In 1974, and again in 1976, the Executive Director of the Papaloapan Commission, Jorge Tamayo, responded to the environmentalist critics. He praised the Commission employees for balancing the various interests of local and national interest groups and claimed that he felt personally responsible for the well-being of the Chinantec Indians who were displaced by the construction of the Cerro de Oro dam. Rapid settlement required the use of heavy machine to clear the dense jungle and concentrated use of chemical fertilizers to make the tropical soils productive using the new hybrid seeds. Agriculture in the tropics demanded that pesticides and herbicides needed to be applied to keep at bay the microbial pests that had always devastated tropical agricultural production.[63] The Commission officials took some environmental problems, such as erosion and controlling floodwaters, seriously, but continued to focus on increasing agricultural production at all costs. Only those environmental factors that jeopardized production attracted considerable attention from planners and the hostility of independent observers caused the Commission "to distrust outside expertise and to depend almost entirely on its [own] technical staff."[64]

By 1978, the Papaloapan Commission was rocked by a series of setbacks. In addition to widespread recognition of the challenges facing "modern" agricultural

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[62] Ewell, *Uxpanapa,* 118-126.

[63] Concentrating agricultural production on mono-crop has frequently made commercial agriculture vulnerable to tropical pests. Classical studies of commercial production of bananas and rubber on tropical plantations include Warren Dean, *Brazil and the Struggle for Rubber: A Study in Environmental History,* (Cambridge: Cambridge University Press, 1987) and John Soluri, *Banana Cultures: Agriculture, Consumption, and Environmental Change in Honduras and the United States,* (Austin: University of Texas Press, 2005).

[64] Ewell, *Uxpanapa,* 129.

development in the tropics, new oil reserves were discovered on the Gulf coast of the state of Veracruz. The federal government shifted resources away from the Papaloapan Commission's budgets, giving the state-run oil company PEMEX greater authority to manage development in tropical lowlands for crude oil drilling and refining. Also in 1978, the two primary leaders of the Papaloapan Commission, Jorge Tamayo and Guillermo Hernandez Castro, died tragically in a heliocopter accident, depriving the Commission of its most influential defenders and spokesmen. By 1982, the Papaloapan projects formally came to an end when the federal government disbanded the Commision. The legacy of scientifically-informed agricultural development, however, continued to influence the international proselytizing efforts of the *Centro Internacional de Mejoramiento de Maiz y Trigo*, (CIMMYT), the successor organization to the Rockefeller Foundation's program in Mexico.

Though agricultural scientists with the CIMMYT continued to focus on the puzzle of increasing production using "Green Revolution" technologies, agronomists began re-assessing the value of indigenous land use practices. Agricultural scientists began to recognize that "Mexico was the site of the domestication of a major share of the world's crops" and that "Mexicans had developed highly productive agriculture within dozens of different climate and ecological settings" for centuries.[65] By the 1980s, Miguel Altieri and his colleagues from the University of California at Berkeley developed the concept of "Agroecology" as a means to integrate traditional agricultural systems with ecologically-sound land use practices. A new generation of academic scientists studied the ways in which human cultures and local ecosystems "coevolved" over time in

[65] Angus Wright, *The Death of Ramon Gonzalez: The Modern Agricultural Dilemma,* (Austin: the University of Texas Press, 1990), 253.

dynamic, interactive systems that recognized how human activities altered pristine environments, but created new types of agriculture that were more productive and more sustainable than "Green Revolution" technologies.[66] New researchers particularly championed intercropping on *milpas* since those farming practices mirrored the complex patterns of vegetation found naturally in the tropics. Intercropping also kept pests at bay, prevented soil depletion, and anchored soils to stop erosion.

New emphasis on ecological "sustainability" also helped revive interest in traditional indigenous land use practices. If sustainability refers to "the ability of an agroecosystem to maintain production through time, in the face of long-term ecological constraints and disturbances as well as an array of socioeconomic patterns," then researchers determined that traditional practices of indigenous peoples in the Mexican tropics ranked among the most sustainable agricultural systems on the planet.[67] The point is not to romanticize indigenous environmental stewardship, nor to offer an alternative to or explanation for the "failure" of modern agriculture. Rather, I suggest that the evident shortcomings of dogmatic, high-modernist development programs, like the Papaloapan projects, and the emergence of ecological critiques converged in the 1980s and 1990s as new discourses of indigenous environmental stewardship and sustainability became politically salient.

Furthermore, I suggest that neither of those phenomena were new to the last decades of the twentieth century. Nor were they simply a response to the pressures of

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[66] Miguel Altieri, *Agroecology: The Scientific Basis of Alternative Agriculture,* (Boulder: Westview Press, 1987).

[67] Stephen Gliessman, "Understanding the Basis of Sustainability for Agriculture in the Tropics: Experiences in Latin America," in Clive A. Edwards, Rattan Lal, Patrick Madden, Robert H. Miller, Gar House, eds., *Sustainable Agricultural Systems,* (Ankeny, IA: Soil and Water Conservation Society, 1990), 379.

neoliberal reforms. Government planners had been unable to reshape tropical nature using hybrid seeds and chemical fertilizers since the 1950s, when colonists abandoned the utopian communities established and coordinated by the Papaloapan Commission for Chinantec Indians displaced by the Miguel Alemán Dam. Since Carl Sauer admonished the Rockefeller Foundation researchers to be mindful of traditional agricultural systems, critics extolled the virtues of respecting and implementing flexible, local knowledges and practices. The new social movements and nativist environmentalism of the 1980s and 1990s represented the culmination of decades of tension between the Revolutionary state that struggled with internal contradictions and local indigenous groups seeking to negotiate their place within the modern nation on their own terms.

Conclusion

By the early 1970s, the Mexican government tried to focus on rural development, but the political climate had changed. As Minister of the Interior, Luís Echeverría had been implicated in the tragic massacre of student protestors at Tlatelolco in 1968. Students and leftist activists argued that since the 1940s the Institutional Revolutionary Party had turned away from the ideals of the Mexican Revolution and that the Tlatelolco Massacre marked the high point of authoritarian rule by the one-party state. Mexican intellectuals and revisionist historians followed the same logic as they challenged the PRI's claims to represent the legacy of the Revolution. However, Echeverría's trials demonstrate the vulnerability of the Mexican state and the emergence of new discourses of political and social protest against PRI. Unable to appease the Left, Echeverría faced a rising tide of violence that included bank robberies by guerrilla bands, student attacks, and kidnappings. He responded, in part, by trying to revive the

populist mystique of Lázaro Cárdenas and focusing on nationalist posturing and rural development, seemingly abandoning the industrialization that took priority during the years of the "Mexican Miracle." Yet, many of Echeverría's rural development initiatives followed the same patterns that informed his predecessors' agendas. A discourse of "the tropics" led government planners to revive efforts to bring the Papaloapan Basin into the nation, and the Echeverría administration continued to display a high-modernist faith in scientific planning. Echeverría looked for technical solutions to the problems of rural development. He favored large-scale, state-run public works projects and empowered scientific experts to centralize and manage development campaigns.

However, by the 1970s, transnational concern over the environment both informed and limited Echeverría's policies. His actions anticipated the contemporary concerns of international environmental justice movements when he challenged the United States government over the salinity of the Colorado River as it crossed the US-Mexico border. Under Echeverría, the state also took the lead in passing Mexico's first environmental protection laws to mitigate air pollution in the major industrial cities. Yet, environmentalists challenged many of Echeverría's proposals. They argued against building a large desalination plant on the Colorado River, and favored a solution that eliminated agriculture production in the unsuitably arid Mexicali Valley. While environmentalists recognized the growing concerns about industrial pollution, few agreed with Echeverría's proposal to mitigate the problem by encouraging industrial expansion to the Mexican countryside. Finally, environmentalists, anthropologists, and agronomists combined to challenge a centerpiece of Echeverría's rural development program. When the Echeverría administration revived efforts to construct a dam to

control the waters of the Papaloapan River and promote agricultural development in the humid tropics, they faced opposition from new quarters. Anthropologists argued that the dam and reservoir would destroy the culture of the Chinantec Indians who were displaced. Local actors mobilized behind community leaders to try and stop the construction, or at least secure the best possible deal for themselves under the changing historical conditions. Environmentalists argued that silts would collect behind the dam and reduce its useful life. They also critiqued the plans to resettle Chinantec Indians in the jungles of Uxpanapa. They saw that small-scale, traditional adaptations were more successful in the humid tropics than the intensive modern agriculture techniques advocated by the Papaloapan Commission and the successors to the Rockefeller Foundation. Dissidents began articulating a discourse of nativist environmentalism that incorporated ideas from Indian rights activists, Indianist anthropologists who challenged their predecessors' mission to incorporate indigenous peoples into the national *mestizo* vision, and natural scientists who increasingly saw the value in local knowledge and indigenous land use practices. Many scholars see the emergence of Mexican environmentalism, along with other new social movements, as a response to the neoliberal reforms of the 1980s and 1990s. However, the environmental protests of the rural poor in Mexico followed a long gestation period and responded to the national development project promoted by the Mexican government since the 1940s.

CONCLUSION

After 1940, the Mexican state turned away from radical revolutionary reforms that characterized the tenure of President Lázaro Cárdenas (1936-1940). Cárdenas and earlier revolutionary leaders like Emiliano Zapata sought to create an agrarian foundation for the nation based on the indigenous tradition of communal ownership of lands called *ejidos.* Mexican presidents after 1940, however, favored large-scale, scientifically-informed rural development projects to bring new areas, like the tropical Papaloapan Basin, into production as a way of increasing food production for a growing urban population that could supply the labor for industrialization. During the 1950s and 1960s, the Mexican economy grew, but the "Mexican Miracle" proved illusory in the long term. The economy could not sustain high levels of growth and the nature of industrialization expanded the gap between rich and poor as displaced *campesinos* fled the countryside for urban shantytowns.

By the 1970s, President Luis Echeverría attempted to appease his critics by refocusing attention on rural development, and renewing a commitment to dam construction and modernization in the Papaloapan Basin. By the 1970s, however, relationships between peasants and the state had changed. Chinantec and Mazatec Indians displaced by public works construction no longer asserted their rights by negotiating with a paternalist government agency. They began to articulate new arguments that challenged assumptions about scientific knowledge that underpinned the state's development schemes and undeminded local, traditional land use practices. A discourse of nativist environmentalism joined a chorus of voices protesting the state by the early 1980s, when technocrats abandoned large scale projects and embraced neoliberal austerity measures to appease international creditors.

Mexico underwent a series of political changes through the 1980s and 1990s that led to the eventual triumph of Vicente Fox's *Partido Acción Nacional* (PAN) in the 2000 elections, thus ending more than seventy years of rule by a single party, the *Partido Revolucionario Institutcional* (PRI). The party had undergone significant changes marked by the party's transformations from Plutarco Calles's *Partido Nacional Revolucionario* (PNR) that united the contentious factions of Revolutionary military officers, to Lazaro Cardenás's more inclusive *Partido Revolucionario Mexicano* (PRM), through the institutionalization of the revolution under PRI in the 1940s. The party's longevity demands explanation. PRI supporters argued that the state successfully integrated the aspirations of various segments of society by incorporating their concerns into a corporativist state flexible enough to address a wide variety of concerns while it continued the legacies of revolutionary heroes. Critics saw something more insidious, as the state repressed political dissenters or co-opted local *caciques*, labor leaders, and intellectual critics.[68]

According to this narrative, the authoritarian one-party state dominated until it was challenged by new social movements opposed to neoliberal reforms, that found political allies among the followers of Cuahtemoc Cardenas who split from the PRI to form the *Partido Revolucionario Democrático* (PRD), and the revolutionary "kitsch" of

[68] The word "cacique" generally refers to an Arawak term used by Spanish conquistadors to identify an indigenous hereditary nobility during the colonial period. However, it is used here in the sense suggested by Alan Knight to distinguish the local powerbrokers and military leaders of the nineteenth-century and the Mexican Revolution (which he identifies, following D.A. Brading, as *Caudillos*) from local political bosses associated with the PRI machine in the twentieth century. See, D.A. Brading, ed. *Caudillo and Peasant in the Mexican Revolution,* (Cambridge: Cambridge University Press, 2008); Alan Knight and Will Pansters, eds., *Caciquismo in Twentieth-Century Mexico,* (London: Institute of Latin American Studies, 2006). For critiques of intellectuals co-opted by the PRI, see Claudio Lomnitz, *Deep Mexico, Silent Mexico: An Anthropology of Nationalism,* (Minneapolis: University of Minnesota Press, 2001), 212-227; Roger Bartra, *Blood, Ink and Culture: Miseries and Splendors of the Post-Mexican Condition,* trans. Mark Alan Healy, (Durham: Duke University Press, 2002), 65-77.

the neo-Zapatista uprising in the southern state of Chiapas inspired Mexican civil society.[69] In many ways, these dramatic moments of political outrage have drawn scholarly attention away from quieter shifts and the emergence of oppositional discourses during PRI's seventy-year rule.

An examination of the discourses and practices of agricultural development in the Mexican tropics and the use of natural resources in the Papaloapan River Basin reveals a different narrative. State planners faced considerable obstacles in their efforts to conquer tropical nature and to incorporate tropical peoples into a modern *mestizo* national developmentalist vision. The state appears, not as a leviathan in the tropics, but as frustrated, limited, fragile, and cumbersome bureaucracy. Despite mobilizing all of the tools of political statecraft and scientific inquiry, the Papaloapan Commission could not conquer tropical nature, and the PRI rural developmental assumptions provoked consistent protest and dissent. During the 1950s, despite local enthusiasm for the jobs that development promised, local actors petitioned the Papaloapan Commission to secure the best compensation for their lost lands and lucrative fruit trees, while agricultural colonists rejected the Commission's schemes for developing the tropics using modern techniques. Though economists and anthropologists worked with the Commission to transform Mexican agriculture and facilitate a shift from indigenous folk culture to modernity, critics, such as Berkeley geographer Carl Sauer and critical environmental activists admonished the government and agronomists associated with the Rockefeller Foundation for discrediting local indigenous knowledge and arrogantly

[69] Bartra, *Blood, Ink and Culture,* 15-43.

applying technologies developed in temperate climates and commercial farms to *ejidal* settlements in the tropics.

During the early 1970s, when Luís Echeverría attempted to conjure the agrarian populist mystique of Lázaro Cárdenas and initiated new construction in the Papaloapan Basin, he faced new forms of political opposition. Environmentalists challenged his propensity for favoring technological solutions for environmental problems. Mazatec Indians opposed the construction of the Cerro de Oro Dam, deploying both political and supernatural strategies. They gained support from a younger generation of anthropologists that questioned, rather than supported, the efforts of the Papaloapan Commission to transform indigenous culture and promote agricultural modernization.

This discussion is not meant to be merely a history of resistance or a history "from the bottom-up" It is a history of "the *insurrection* of subjugated knowledges."[70] The history of a discourse of nativist environmentalism unsettles objective claims to scientific truth, and upsets teleological notions of progress toward a scientifically-informed modernity. It has not been my intent to link the emergence of a nativist environmentalism to any particular environmental or indigenous rights movement or organization. Instead, I have drawn upon Foucault's notion of genealogy to explore the "union of erudite knowledge and local memories" which allow us to critique universal claims to scientific truth. Following Dipesh Chakrabarty, I have also tried to demonstrate how a discourse of nativist environmentalism disrupts ideas about the progress of time and forces us to acknowledge the plurality of a modern present in which we inhabit the fragments of the past. The emerging political salience of traditional knowledges both

[70] Foucault, *Power/Knowledge,* 81.

represented the intrusion of the past into the present, and also allowed for a new hybridity in which indigenous knowledge confronted modern science on the same epistemological terms.

The point is not to proclaim the triumph of local knowledge over an exclusionary agricultural "science." Indeed, such was not the case, as a focus on technological solutions to narrowly construed scientific puzzles continues to influence agronomists and policy makers in Mexico and throughout the postcolonial world. The emergence of nativist environmentalism, then, should not be understood as a "paradigm" shift of the kind described by Thomas Kuhn. Rather, it represents a moment in which local contingencies and universal truths, the "traditional" and the "modern," the past and the present converge to displace facile claims to authority and to disrupt the usual teleologies.

With this study, I have tried to accomplish two things. First, I have tried to connect the concerns and methods of environmental history with those of postcolonial and subaltern studies using development schemes in the Mexican tropics as an example for thinking about the limits of the state's power to construct and maintain hegemony in postcolonial nations. I argue that postcolonial perspectives about the relationship between the construction of environmental knowledge and the exercise of political power are useful for understanding how tropical places and people are discursively constructed in ways that allowed state intervention, about how the legitimization of scientific knowledge buttressed regimes of power, and about how such discursive constructions have marginalized local knowledges and subaltern political/environmental concerns. The history of the Papaloapan projects in southern

Mexico offers the possibility for meaningful discussion between postcolonial criticism and environmental history as practitioners from each field attempt to move beyond modular geographic and theoretical boundaries. However, subaltern knowledge and subaltern politics can never be completely dominated, and Mexican examples suggest that new discourses of nativist environmentalism emerged to challenge state high-modernist development on its own terms by promoting indigenous agricultural practices that proved to be both more productive and more sustainable under tropical conditions.

Second, I suggest that the strong opposition to the Papaloapan project should cause us to reevaluate dominant narratives not only about the state but also about environmentalism in Mexico. Just as Mexican examples can help rethink postcolonial and environmental theories, new critical approaches and theoretical insights cause us to question dominant historiographic narratives. I argue that the PRI's efforts to extend state power into the tropical south faced considerable challenges from both the natural world and from critics who mobilized against state development projects and who questioned the underlying assumptions and discourses that guided state planners. Over the course of four decades, dissidents critiqued the high-modernist faith that championed scientific knowledge and denigrated traditional agricultural practices. As state officials and agronomists promoted the expanded use of Green Revolution technologies and renewed efforts to develop the tropics of Papaloapan, they faced considerable challenges from opponents who articulated a discourse of nativist environmentalism that defended local, traditional forms of knowledge.

For nearly four decades, the Mexican "leviathan in the tropics" fielded a small army of economists, anthropologists, and agronomists, government planners who

maintained a high-modernist faith that science could finally conquer the unruly tropics. The failures of the Papaloapan projects offer cautionary lessons for development schemes in other tropical areas, but it would be a mistake to conclude that “the tropics conquered the Papaloapan projects.” Discourses of development of all kinds continue to be influential in Mexico and beyond, not least among them those that herald a new era of “sustainability.”

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