

Blood and Water

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Blood and Water

The Indus River Basin in Modern History

David Gilmartin



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For Sandy

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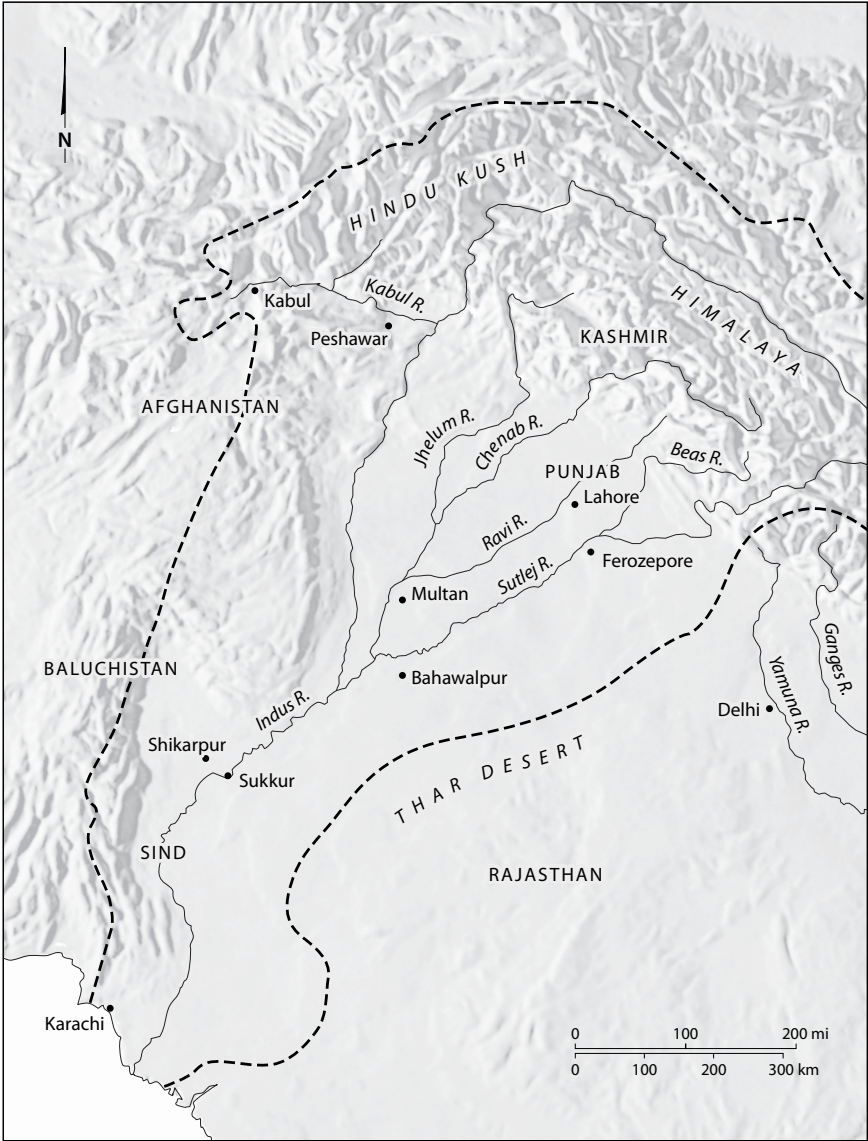
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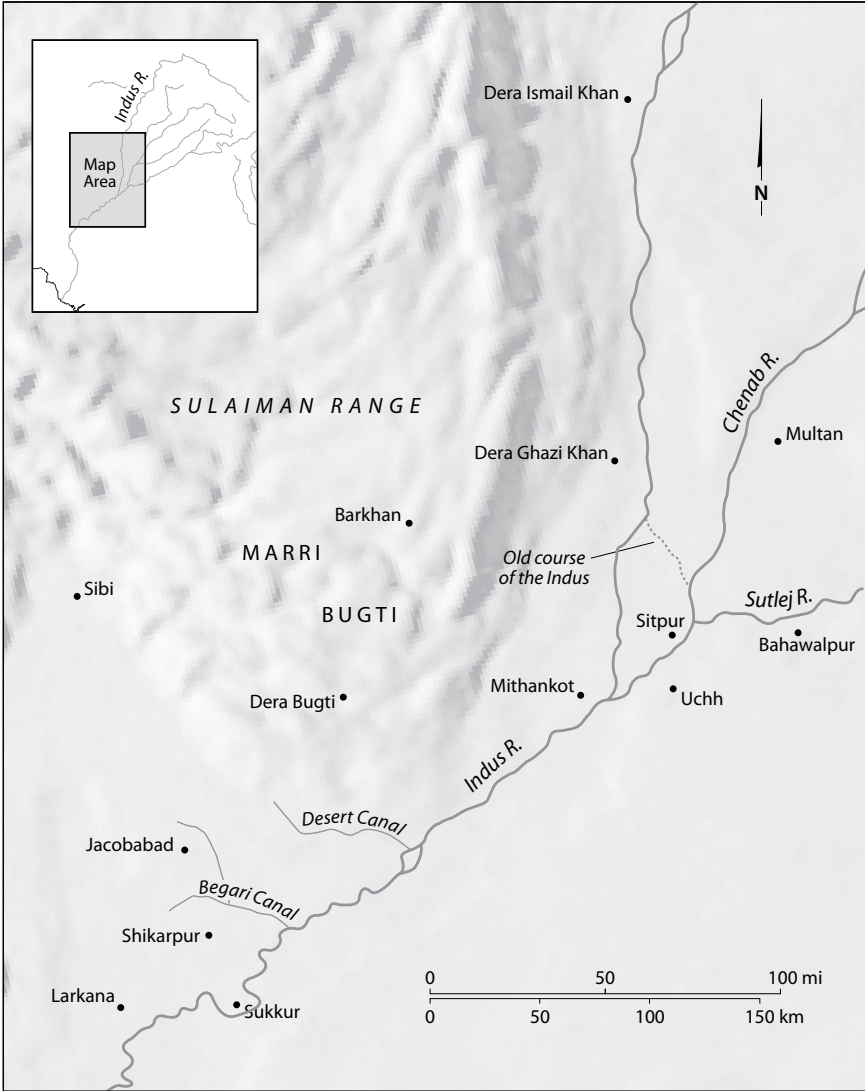
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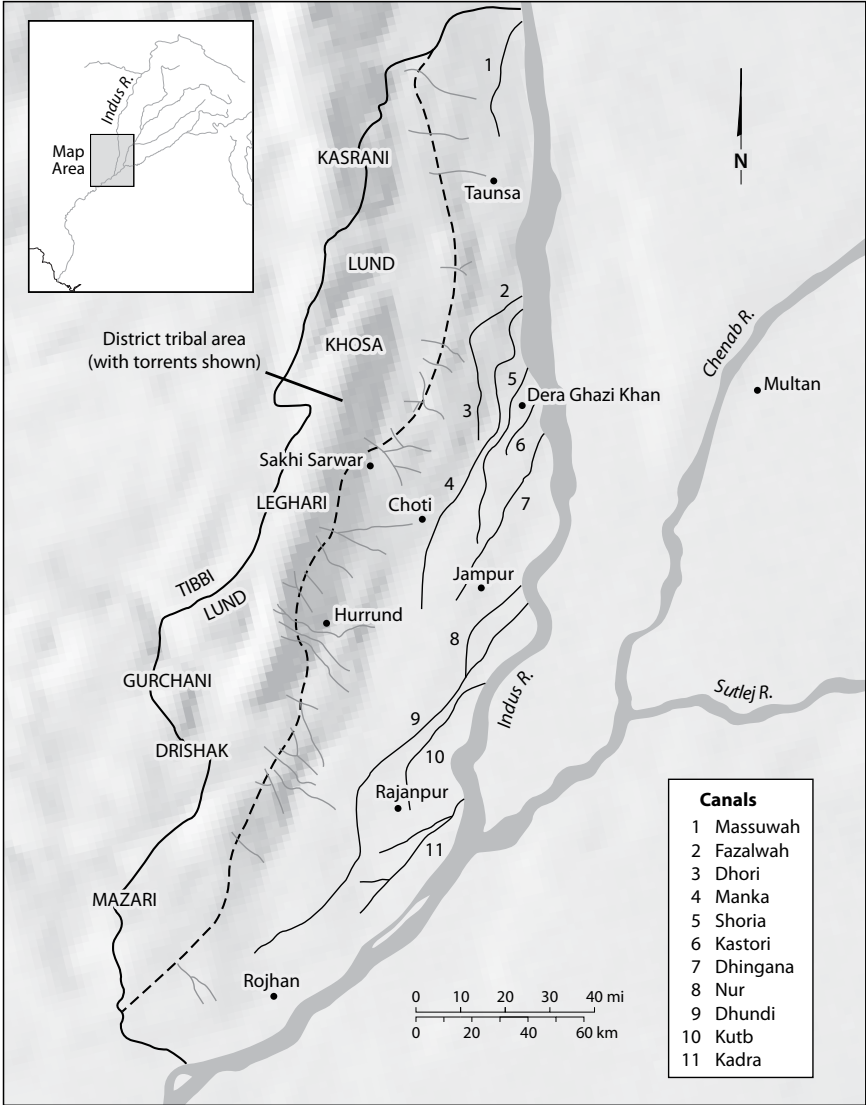
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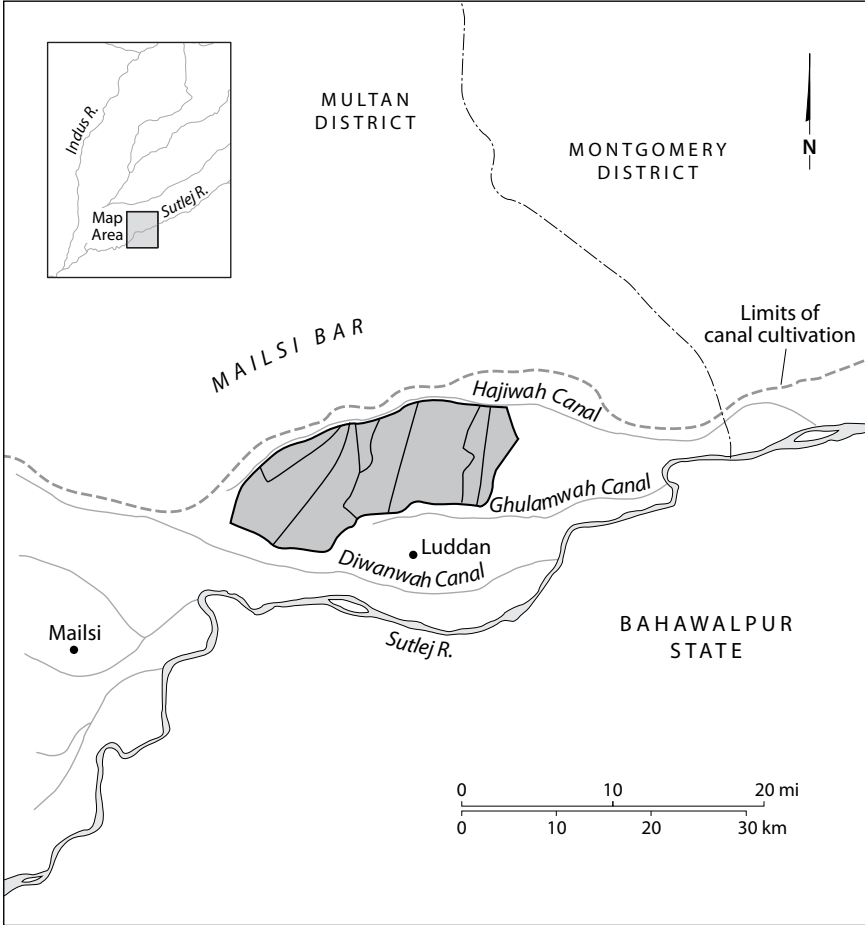
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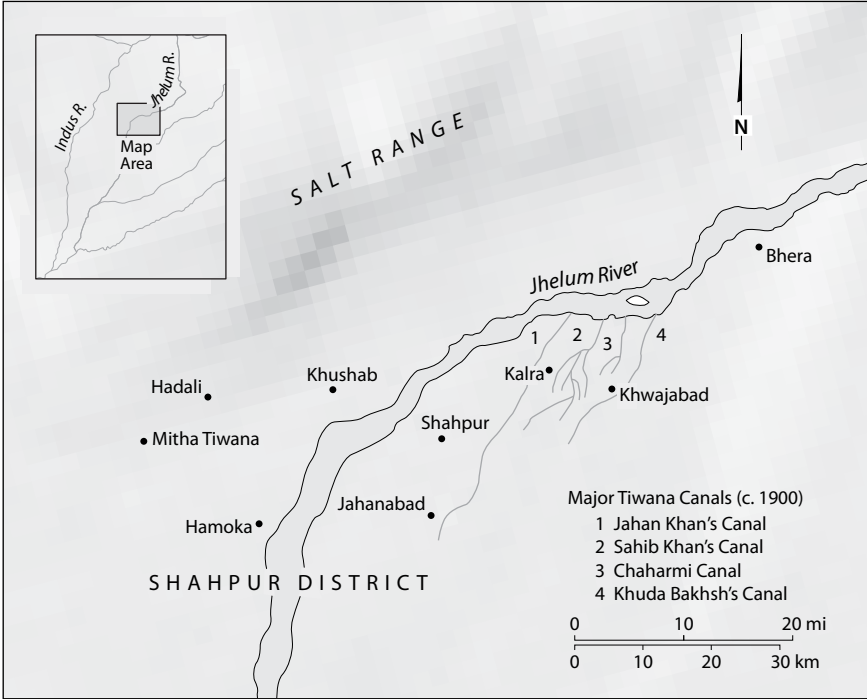
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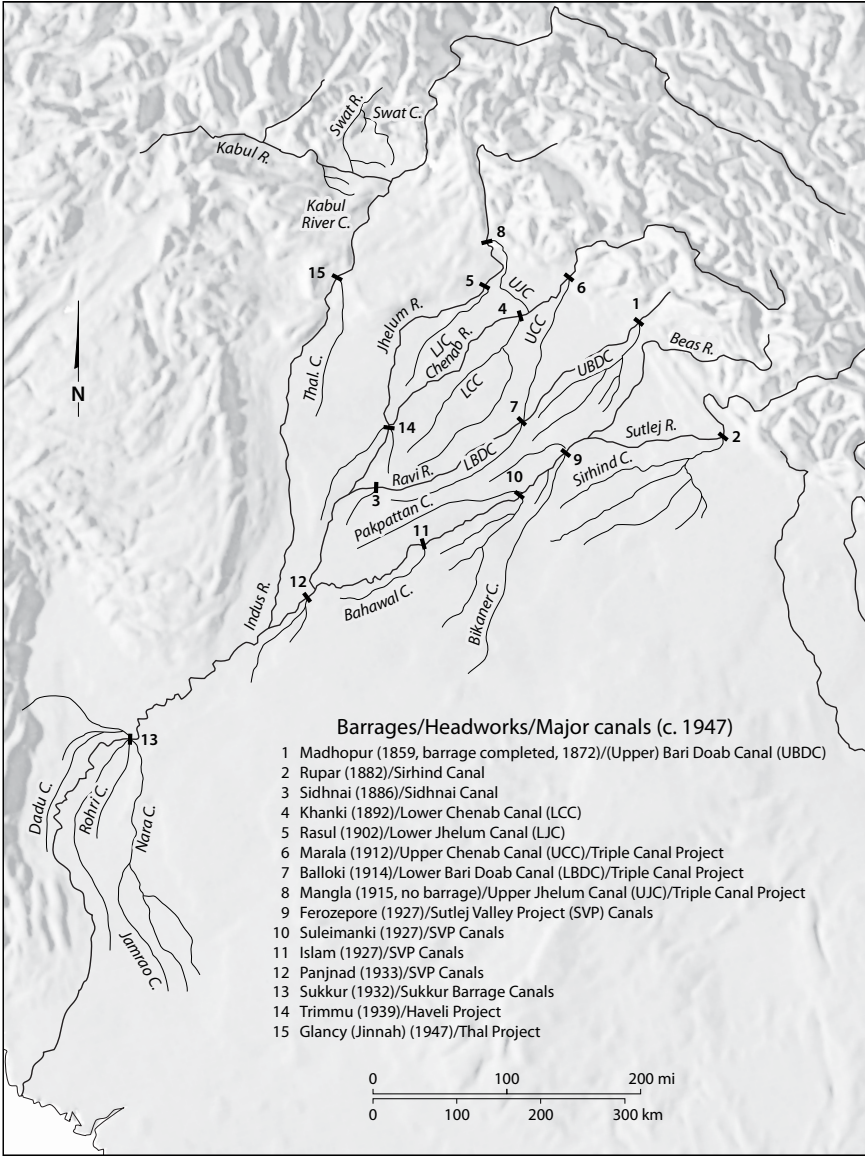
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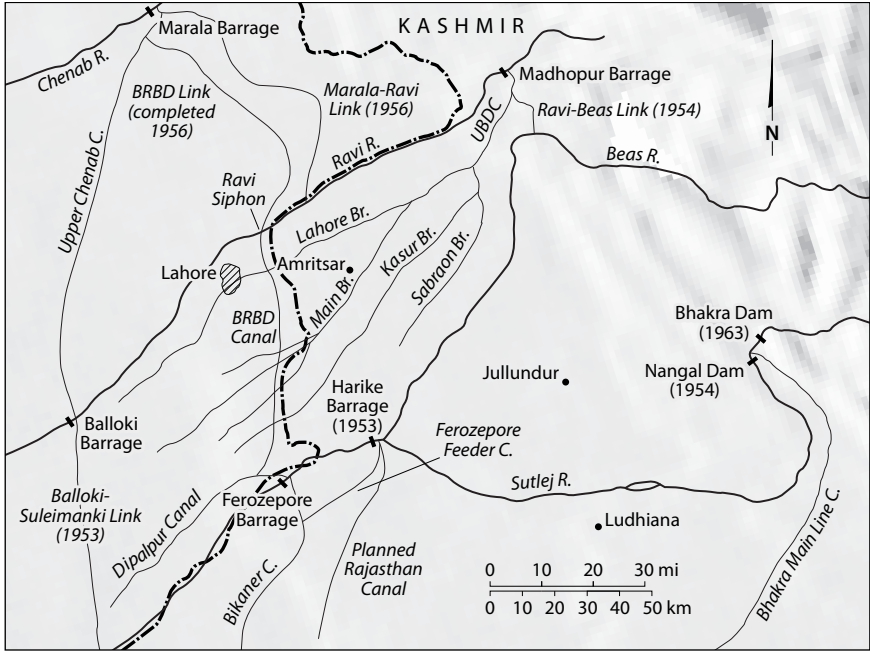
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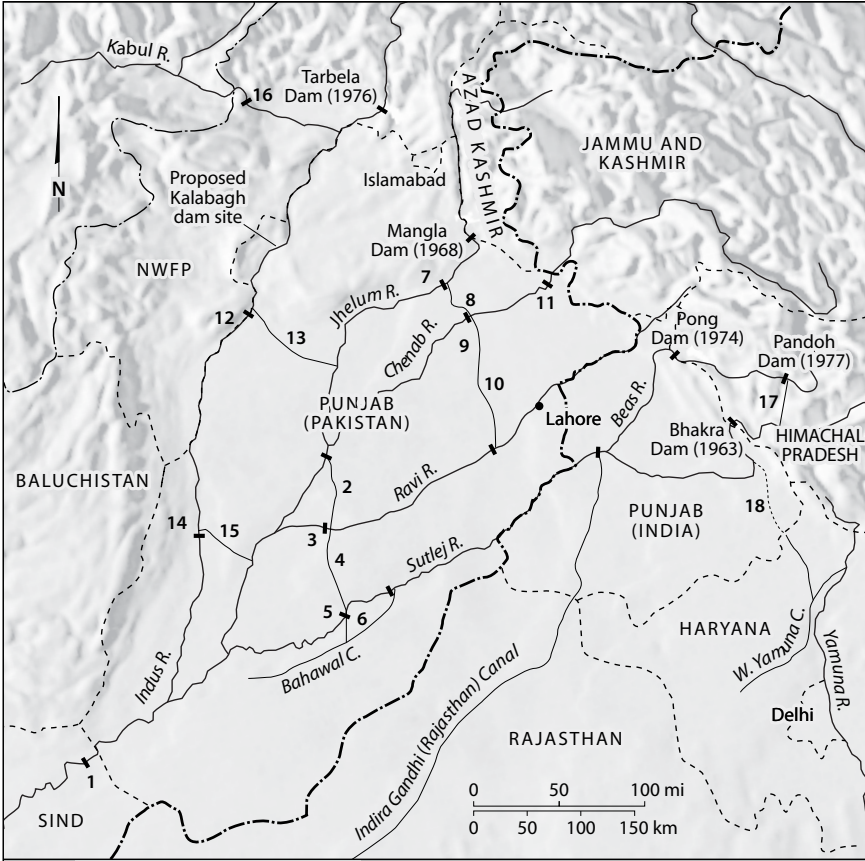
MAP 6. Major Tiwana canals, ca. 1900.



MAP 7. Perennial canal system in the late colonial period, ca. 1947.



MAP 8. Partition and its aftermath in central Punjab.



Major New Barrages/Links (c. 1960–c. 1990)

- | | |
|--------------------------------|------------------------------------|
| 1 Guddu Barrage (1962) | 10 Qadirabad-Balloki Link (1968) |
| 2 Trimmu-Sidhnai Link (1965) | 11 New Marala Barrage (1968) |
| 3 New Sidhnai Barrage (1965) | 12 Chashma Barrage (1971) |
| 4 Sidhnai-Mailsi Link (1965) | 13 Chashma-Jhelum Link (1971) |
| 5 Mailsi Siphon/Barrage (1964) | 14 Taunsa Barrage (1958) |
| 6 Mailsi-Bahawal Link (1965) | 15 Taunsa-Panjnad Link (1970) |
| 7 New Rasul Barrage (1968) | 16 Warsak Dam (1960) |
| 8 Rasul-Qadirabad Link (1968) | 17 Beas-Sutlej Link (1977) |
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Introduction

Community and Environment

Changes in structures for controlling water transformed the Indus basin in the century and a half from 1850 to 2000. A largely arid region with a historical mix of varying forms of agricultural and pastoral production, the Indus basin became, by the second half of the twentieth century, one of the globe's most heavily irrigated river basins. At the time of the British departure in 1947, there were some twenty-six million acres of irrigated land within the Indus basin, which encompassed by then the largest integrated, state-controlled irrigation system in the world—and one that had made the region one of the most agriculturally productive in India.¹ Divided between India and Pakistan by the subcontinent's partition, the Indus basin's irrigation expansion nevertheless continued apace after 1947—on both sides of the border. The Indus basin today supports a dense agricultural population whose size would be unthinkable without the transformations that extensive irrigation wrought.

The story of irrigation in the Indus basin is one of modern history's great stories of large-scale environmental transformation, but it is also a story of changing relationships between Indus basin society and the state. A large-scale environmental history of the Indus basin has yet to be written. If it were, it would focus on many of the critical processes that have transformed South Asia more generally. An environmental narrative of the Indus basin would of necessity incorporate long-term interactions among pastoralism, migration, agriculture, and trade. It would lay out changes in patterns of land use as agriculture expanded (and sometimes contracted) in response to technological and political changes, focusing on the dramatic expansion in the production of commercialized cash crops (particularly wheat, cotton, and rice) that came in the twentieth century. Yet it would also offer

something more. It would detail how the very process of environmental transformation was linked with changes in the imagining of the human communities—defined by relationships to nature—that bound visions of state power and the people of the Indus basin together.

The relationship between changing natural environments and changing structures of community lies at the heart of this book. As the British colonial state transformed the landscape of the Indus basin, it also redefined its claims to legitimacy through its reformulation of communities defined in relationship to nature. On one level, the construction of massive new physical works underscored the state's new claims to legitimacy, framed by its role as the mediator of an imagined community of producers dependent on new, scientific technologies of water control. But, on another level, the state also molded and manipulated forms of indigenous community whose relationships to nature had long shaped forms of community organization and imagining. These included not only communities of production but also communities of "blood," newly reordered through programs of large-scale settlement and of property delimitation. "Blood" and "water" came to be intimately linked, and in ways that were to have a profound impact on the state's relationship to Indus basin society. The story of the transformation of the environment is also the story of the transformation of community and of the forms of state legitimacy with which this was intimately connected.

DEBATING THE POLITICS OF NATURE'S TRANSFORMATION

As the framework for a story of modern agricultural expansion, the Indus basin's history has long been the subject of historical attention. With the region the most important focus for state investment in irrigation in British India, the degree to which the expansion of irrigation laid the groundwork for capitalist transformation—particularly in the Punjab—has been a staple of historical debates, and one that has often focused on the impact of colonial policies in either facilitating or retarding this process.² But the history of the state's relationship to nature and production is important for more than the history of capitalism. Environmental history provides a critical ground for exploring the relationship between community, environment, and the structuring of legitimate political authority on a much deeper level.

The close connection between irrigation projects and state legitimacy was never far from the surface in British thinking as they undertook the major projects of environmental transformation that changed the Indus basin. This was captured nowhere more clearly than in a review of colonial irrigation undertaken for the British Council by Gerald Lacey, one of the most eminent twentieth-century British Indian water engineers, shortly after partition. Lacey, though hardly oblivious

to the problems associated with British irrigation, detailed the vast transformations in land use that had irrevocably changed the Indus basin by the time of the British departure in 1947. This was a story told in part through the numbers of new works constructed by the British and the millions of acres brought under canal command. But “when irrigation is conducted on so vast a scale and works of such magnitude are involved,” he wrote, “the mere repetition of figures and statistics falls on a dulled imagination.”³ Rather, the deeper significance of British irrigation lay in its links to the larger modern “epic” (as Sir Douglas Harris put it in his foreword to Lacey’s account)⁴ of man’s conquest of nature for productive human advantage. With scientific knowledge of nature serving as a touchstone for the legitimacy of rule, this was a story that transcended the bounds of colonialism and, as Lacey saw it, ultimately encompassed both colonial and national forms of rule. It was a saga brought to fruition in the Indus basin by “generations of engineers,” British and Indian alike. “The Indian Service of engineers in which the British and their Indian colleagues laboured for so many years has passed away,” Lacey wrote, but, in independent South Asia, “the tradition remains and is a living force,” continuing to shape the ongoing expansion of Indus basin irrigation in India and Pakistan.⁵ “The irrigation works of India and Pakistan, down to the smallest distributary channel, and the loneliest canal ‘inspection-house,’ must always remain,” Lacey declared—evoking a modern archetype of nationalist sacrifice, but linked here to the disinterested profession of scientific control over nature—“a monument to the unknown engineer.”⁶

This image of irrigation patronage as a selfless and beneficent gift to the people was, for all its modern, scientific (and propaganda) emphases, one with well-established links to notions of ruling legitimacy in precolonial India.⁷ Cultural assumptions about the legitimizing significance of water control can be seen in the many indigenous, colonial-era ballads celebrating the exploits of British water engineers and casting them as water patrons, much in the mold of earlier rulers. Anand Pandian has thus described the persisting, heroic image of one colonial engineer, the man responsible for the Periyar dam in South India. Large-scale irrigation patronage found deep resonance in popular thinking, he notes, and was associated with the sympathetic delivery of nature’s bounty to the people.⁸ Similar attitudes emerge in the Indus basin (whatever the regional differences in their cultural framing), as evidenced by Punjabi praise poems to nineteenth-century colonial irrigation builders and entrepreneurs, such as Popham Young, the administrator most associated with the settling of the Punjab canal colonies,⁹ or Captain L. J. H. Grey, who personally supervised the construction of a network of canals in the Punjab’s Ferozepore district in the 1870s. Grey “was terrible to look at like a king,” a balladeer wrote in praise, but “he performed all his works by kindness to the people.” With a formerly dry country watered, he was, the poet proclaimed, “like a hundred Alexanders.”¹⁰

But if such works showed beneficence, they also reveal irrigation patronage as an act of power, bound up with all the moral ambiguities that the direct exercise of state power over nature inherently involved. The flip side of a vision of beneficent rule rooted in irrigation patronage was thus a vision of water control as a source of the most potentially oppressive authority. If men like Grey were praised for bringing arid lands under productive command, they were also the focus of deep controversy and complaint both from other colonial officials and from the local people.¹¹ The operation of large-scale water control as a form of potentially overbearing state power was the subject of intense debate in the mid-twentieth century, extending well beyond the Indus basin. The relationship of water control (and, more broadly, of state-directed control over nature) to the dangerous authoritarian tendencies of the modern state was argued forcefully by Karl Wittfogel in the 1950s. The historical roots of modern despotisms in state-managed irrigation works lay at the root of Wittfogel's focus on what he came to call "oriental despotisms." Reliance on large-scale water works removed power from local hands and vested it in the hands of authoritarian managers, who controlled the knowledge, the powers of labor mobilization, and the military means to protect these works. Such concentrations of power in turn led to hierarchical class divisions and to the ideological structures needed to legitimize such authority. Although Wittfogel's arguments drew heavily on ancient examples, they were intended primarily as a critique of authoritarian state power in his own day and its relationship to the forms of power that water control in arid environments—and scientific control over nature—seemed to legitimize.¹²

As a guide to the actual operation of large-scale irrigation systems, Wittfogel's arguments have proved generally unhelpful.¹³ But in directing attention to the moral ambiguities inherent in state control over irrigation, they have exerted an important influence over the debates modern irrigation has engendered. As Erik P. Eckholm noted in the 1970s, in a work inspired by the 1972 U.N. sponsored Stockholm Conference on the environment, the great irrigation works of modern times had come to dramatize the dangers inherent in efforts to expand large-scale control over nature without sufficient attention to the "ecological requisites" of nature itself.¹⁴ In the 1990s, Sandra Postel underscored these moral ambiguities in her discussion of the "irrigation miracle" of the twentieth century, a world-wide phenomenon in which the Indus basin's transformation played an exemplary early role.¹⁵ The twentieth-century explosion of irrigation transformed world agriculture on an unprecedented scale, she writes, promising a plenty of agricultural production previously unimagined. But it also entailed a vast "Faustian bargain" with nature, in which state power—and the hubris of state knowledge—was deeply morally implicated. "In return for transforming deserts into fertile fields and redirecting rivers to suit human needs," Postel suggests, nature has written its own counter-narrative, "exact[ing] [its] price in myriad forms,"¹⁶ a price paid by the

people who have borne the brunt of ongoing environmental deterioration.¹⁷ Perhaps the most explicit linking of a critique of large-scale irrigation with a moral critique of the modern state is found in the work of the American environmental historian Donald Worster on the western United States. Wittfogel's central question, as Worster restates it, was "How, in the remaking of nature, do we remake ourselves?" Worster's answer followed the critique Wittfogel laid out, though he linked the rise of authoritarian control over nature not to "oriental despotism" but to modern capitalism itself. Modern large-scale irrigation works, in which the state has become a tool of the capitalist and instrumental desire to dominate nature, were, in Worster's argument, fundamentally inimical to freedom. "Democracy cannot survive," he wrote, "where technical expertise, accumulated capital, or their combination is allowed to take command."¹⁸ Large-scale control over nature could, in such a view, only have a corrupting effect on the morality (and reciprocity) of power itself.

Such environmental critiques have, of course, come to be inflected in distinctive ways in the South Asian context—and with respect to the Indus basin—by the history of colonialism, and the forms of statecraft and community organization it encouraged.¹⁹ Indeed, while debates on the costs and benefits of large-scale irrigation in the Indian subcontinent have in some ways tracked debates about the environmental history of water control elsewhere,²⁰ the political implications of India's irrigation development have come to be grounded in distinctive analyses of the nature of colonial rule as a political system. Such questions have taken on particular force in South Asian history precisely because large-scale projects of control over nature—such as the transformation of the Indus basin—have become touchstones for assessing the relationship between the colonial past and the new, national—and democratic—identities that succeeded, as Lacey's comments on the transition from colonial to national rule in 1947 suggested. The critique of large-scale irrigation has thus been linked for many in the South Asian context to a search for indigenous, small-scale models of adaptation to nature as an alternative genealogy for national identity, independent of the grand epic of large-scale scientific control of nature that in the Indus basin seemingly legitimized the colonial state—and whose legitimizing mantle was bequeathed to the "developmental" states that succeeded it.

It is in this context that much has been written on local, "community-based" irrigation works, on the "local knowledge" these entail, and on the ways in which they have declined under the onslaught of state-based irrigation works.²¹ Narratives of environmental decline—in the face of capitalism, "expert" knowledge, and the hubris of the modern state—though at one time a staple of environmental narratives more generally, have taken on their own distinctive valences in South Asia not only as a critique of "post-colonial governmentality"²² but also as a plea for more attention to be paid to South Asia's local, seemingly more "authentic"

traditions of environmental adaptation. In the works of more polemical writers, such as Vandana Shiva, this narrative of decline in the face of large-scale state action has embodied the call for a more communitarian (and feminist) national ethos.²³ But even for more mainstream environmental historians, such as Madhav Gadgil and Ramachandra Guha,²⁴ this narrative of environmental decline in the face of state-based technicalism offers an alternative to the grand epic of state-based science, thus suggesting the possibility of an alternative environmental morality with perhaps more democratic and participatory potential—and a less evident colonial genealogy. Indeed, such ideas exerted widespread influence in both India and Pakistan in the years after 1980 in calls for more participatory, “grassroots” developmental initiatives across a range of settings.²⁵

Yet such highly moral uses of environmental history have also provoked their own reactions. As many historians (and historically minded anthropologists) have pointed out, such environmental narratives of decline can easily romanticize small-scale irrigation, ignoring the power relations that have shaped water control on all levels and at all times, long before the great projects of the colonial era. Many recent works have thus challenged the underlying assumptions in such narratives in fundamental ways. As David Mosse has shown in his careful study of tank irrigation in South India, neither the state nor the local community can be easily understood as bounded, alternative entities in the morally charged ways that more populist environmental narratives have tended to present them. Mosse’s work explores with great sophistication the history of water control as a facet of “statecraft” in the broadest sense, involving multiple players on many levels, linked historically to shifting structures of power, governance, and legitimating ideology.²⁶ From such a perspective, the dichotomy of “state” versus “local community” largely dissolves—and can be seen to be as problematic as the simple dichotomy between the “indigenous” and the “colonial” as a framework for understanding different forms of management. The rejection of such dichotomies—and of the fixed boundaries of analysis they enable—has thus proved central in undermining *both* triumphalist narratives of colonial progress *and* the romanticized counter-narratives of autonomous, authentic, community-based irrigation development that arose in their place.²⁷

But as Mosse’s work also suggests, the conceptual juxtaposition of opposing images of large-scale, bureaucratized irrigation, on the one hand, and small-scale irrigation adapted to local “community,” on the other, has its own intellectual history, rooted in “150 years of state making” in South Asia since the mid-nineteenth century.²⁸ The way these images were juxtaposed was itself a product of the structure of colonial thinking. To understand the larger political dynamics of the Indus basin’s transformation, it is thus critical to begin with a historical examination of the roots of these dichotomies themselves. Indeed, it is the argument here that, if the history of “statecraft” is central to the history of irrigation, then the intellectual history of the relationship between “state” and “community” (and the “environment”) as *concepts* must

be at the heart of the history of nature's transformation under the colonial regime, for only in this context can we trace the intertwined history in the Indus basin of irrigation and modern forms of statecraft. However inadequate intellectual history may be as a framework for fully understanding the history of irrigation in all its myriad local details, the conceptual history of terms like "community" and "environment" is central to linking the large story of the Indus basin's dramatic transformation under colonial rule in the nineteenth and twentieth centuries to the great redefinitions of state power—and its morality—that have marked the modern era. Indeed, to analyze the historical saga of Indus basin irrigation, it is necessary, I would argue, to begin with the concept of "community" itself—and the ways that its meanings were fundamentally intertwined both with the history of the state and with changing ideas about nature.

Indus Basin Irrigation and the Concept of Community

The relationship between community and water control can, of course, be examined on multiple levels, as the term "community" has multiple meanings. In its most common usage, "community" in matters of water control is often used to refer to the collective interests and actions of local irrigators in contradistinction to the dictates of bureaucratic or state-level water control. But to embed the environmental transformation of the Indus basin in its political context, it is critical to take a larger view of community and to ground its meanings in the nineteenth-century debates in Britain about social order and the role of man's relationship to nature more broadly. "Community" was not just a local thing but a concept central to modern reformulations of the legitimacy of power on a broad scale.

As Raymond Williams notes in his classic, *Keywords*, "community" in its modern usage (and in its relation to modern statecraft) was a concept grounded in the nineteenth century in the uncertainties of a European social order undergoing rapid economic and social change.²⁹ For a range of late nineteenth-century social theorists, the concept of community was deeply intertwined with the search for a stabilizing sense of belonging—often through relationships to nature—in the face of the loss, alienation, and atomization associated with capitalism and "modernity" (a concern, of course, still reflected in the narratives of "loss" surrounding many accounts of "traditional" irrigation today).³⁰

However—and this is necessary to understanding the story of the Indus basin—the linking of "community" to nature took at least two broad, contrasting forms, suggesting antithetical conceptions of how man's relationships to nature generated such a stabilizing sense of common community and belonging. Two oppositional visions of man's relationship to nature, both deeply rooted in the broad currents of late nineteenth-century intellectual history, were central to colonial definitions of community in the Indus basin—and to community's role in the stabilization of the state's authority during the region's great environmental transformations.

The first vision of community was one predicated on the autonomous actions of man on nature, with man conceptualized as a rational actor standing apart from nature and turning it to his productive benefit. This was a vision lying at the heart of the worldview of many nineteenth-century engineers, and it was central to the eventual emergence of technical “development.” Yet it was a vision also imbued with the imagination of a common community of producers—a community rooted in the common need of *all* producers to adapt to nature’s unifying laws. The shared requirements of wresting production from nature forged, in other words, a utilitarian, “public” community of rationalizing individuals transcending self-interested competition.

This conception of community was perhaps articulated most clearly in the high colonial period by William Willcocks, one of the most influential late nineteenth-century British Indian water engineers; he was trained in India but spent much of his career in Egypt. If the story of modern irrigation was an “epic” in the sense discussed earlier, then for Willcocks this was precisely because it created a sense of common community that, even amid the conflicts of capitalist modernity, was dictated ultimately by nature’s overarching laws. This was, for Willcocks, a form of community as old as civilization itself. “When hundreds and thousands of families had at first to learn the laws of nature, then apply them, and then live in accord with one another, in order to ensure the irrigation and drainage of their individual holdings,” Willcocks wrote, “true civilization took its birth.”³¹ Such a vision of civilization—rooted in the productive control of nature—had gained all the more importance in modern times. Whatever men’s varying interests, nature’s laws dictated, as Willcocks put it, that men “work in accord with each other, . . . respect each other’s rights, . . . combine together, and finally . . . exercise their intelligence to the full.”³² Here the autonomy of nature’s energy—to which men, as active, economic agents (and as rationalizing actors) were forced by the basic requirements of modern production to collectively respond—shaped the idea of a community defined by a commonality of rational action upon nature.

Yet, if the unity of nature’s laws themselves called into existence a powerful imagined community of producers, this was also a conception of community with its own, potentially divisive, internal tensions. On one level, with knowledge of nature’s autonomous—and unifying—processes at its center, this was a vision that self-consciously transcended the potential internal tensions associated with the differing claims of land, labor, and capital—and individual interest. But, on another level, with the common discipline of nature’s laws at its root, it was also a vision that gave pride of place to those with the greatest control of technical, scientific knowledge. As we have seen, in the eyes of some critics such as Wittfogel (and his later followers), such a vision was less a recipe for large-scale “community” than for an authoritarianism of expertise backed by the state, a vision easily juxtaposed against the seemingly more organic community of the localities. Yet the key to Willcocks’s

vision lay not in the juxtaposition of bureaucratic expertise against local knowledge or local community but in the incorporation of all those whose engagement with production was regulated by the rational, productive exploitation of nature, on whatever level of scale, into an overarching utilitarian “public” (a usage of “public” captured in the nineteenth-century development of the concept of “public works”). The “river basin,” imagined as a “natural” unit—and one conceptually prior to the marketplace—thus represented a particularly clear frame for the incorporation of communities on multiple levels of scale into a “natural” whole.³³ Indeed, in this context, the river basin came to be imagined, as Richard White has put it, as an “organic machine” of many interlocking parts, shaped both by nature and by a rationalizing, overarching human community generated by the common needs of production (or “work,” as White puts it) on all levels.³⁴

But this was a vision of community juxtaposed in the late nineteenth century against a second, powerful form of community that was projected as quite contrary to this one—that is, as the *antithesis* of productive instrumentality. In this view, the search for stabilizing forms of community in the face of the potentially disordering power of capitalism required that men turn to bonds generated entirely *outside* the realm of processes of production, because—contra engineers like Willcocks—only there could men generate a sense of belonging transcending the peculiarly powerful, and atomizing, stresses that modern production and environmental change generated. This alternative vision of community—generated not by man’s rational, productive action upon nature but rather by the reverse, nature’s nonproductive impact upon man—also gained an increasingly important place in late nineteenth-century social theorizing. Indeed, in some ways the imagining of a community defined by man’s rationalizing capacities as a producer (standing apart from nature) authorized (even, perhaps, required) the imagining of an alternative type of community rooted in the opposing impulses of human nature—impulses dictated to man *by nature*. In such a framing, community arose in part from the commonalities of sympathy, awe, and worship generated by nature’s powerful emotional and aesthetic influence on man’s internal, affective nature; it arose in part from the ties of heredity and race that defined the individual as an intrinsically biological, racialized, and gendered being; and it arose in part from the reification of a language of kinship, or “blood,” derived from the assumed primacy of the family (or, in the colonial context, of the lineage and “tribe”) as “natural” units.³⁵ These forms of community represented not simply “local” alternatives to larger communities of production but also alternative *conceptions* of the meaning of community. They could operate, like communities of production, on multiple levels of scale, ranging from the “family,” to the “clan,” to the “race,” to the “nation.” But, perhaps most critically, they were seen by many nineteenth-century thinkers as antidotes to the political dangers of a world defined simply by productive instrumentalism.

The juxtaposition of these opposing community forms profoundly shaped colonial statecraft during the time of the Indus basin's transformation. The colonial world was a prime site for projects of capitalist action and exploitation, a central venue for action in controlling nature, as the history of the Indus basin illustrates. Comments by engineers such as Lacey and Willcocks suggest clearly the importance of a model of community linked to transformative action upon nature (we might even say scientific "mission") as a legitimizing foundation for the colonial state as a "modern" institution. The Indus basin's transformation was, in this sense, only the most spectacular of many such examples of action upon nature in the colonial world. But this was commonly juxtaposed in colonial statecraft against an alternative, politically stabilizing vision of community with antithetical roots. Colonized countries like India were widely projected in colonial writing as lands where nature's influence upon the ordering of community and society was deep-seated and widespread—and where nature acted upon man far more than the reverse.³⁶ A vision of India as the land of "natural" communities—observable in a form pre-dating (and therefore in their origins entirely distinct from) capitalist development—thus provided a compelling countervailing image that most nineteenth-century colonial administrators projected as critical to social order in India (and, indeed, in most Asian and African colonial contexts), even as they also saw their rule in the subcontinent as bringing India under the sway of the laws of modern political economy.

The developing intellectual framework for this juxtaposition in India in the late nineteenth century can perhaps be most clearly seen in the thinking of Sir Henry Maine, who served as the legal member on the Viceroy's Council in the 1860s.³⁷ It was Maine who first laid out the vision of evolutionary progress from communities defined by "status" to those defined by "contract." For him, communities based on "contract," rooted in an abstracted vision of a "rational man," provided the bedrock for rationalized visions of human community. Indeed, Maine himself played a critical role in embedding this vision of community in the provisions of the most important statute that came to govern colonial Indus basin irrigation projects in the late nineteenth century, the 1873 Canal Act (described in chapter 4), in whose drafting he had an important hand. But Maine was also deeply impressed while he was in India with the social importance of the distinctive, and countervailing, forms of natural community (or community shaped by nature's actions upon man) that he observed there. "There can be no question of the scientific propriety of [political economy's] method, or of the greatness of some of its practical achievements," he wrote. "Yet only its [political economy's] bigots assert that the motives of which it takes account are the only important human motives, or that whether they are good or bad, they are not seriously impeded in their operation by counteracting forces."³⁸ The power of such "counteracting forces," particularly as they were manifested in natural, kinship-based communities, was a central lesson that

Maine took from India. Indeed, Maine saw India as a window on Europe's own, precapitalist past and thus as a guide to how such "status"-based communities had historically developed and evolved. But, for Maine, a vision of historical evolution (or progress) did not simply consign such communities to the past; it also provided a frame for hierarchizing them as they were juxtaposed with productive communities in the present.³⁹ Even as they were ranked in an evolutionary hierarchy, *both* forms of community were projected as critical to the modern colonial state.

This perspective is also significant in understanding how the concept of "environment" came to play an important role in colonial statecraft. The term "environment" (in the sense of a "natural environment") was only in process of emerging in its modern usage in the late nineteenth century, and its direct usage in the Indus basin was quite limited until well into the twentieth century. But the *concept* of a natural environment is nevertheless relevant to the Indus basin's story precisely because its emergence was closely intertwined with the rise of these two antithetical, yet interacting, concepts of community in British thinking: one a product of nature acting upon man, the other of man acting upon nature. Indeed, the critical significance of "environment" as an evolving concept lay in its giving these forms of community an increasingly *spatialized* framing in the late nineteenth century, a framing critical to the territorialized development of colonial administration more broadly—and one within which different forms of community could be structurally brought together.⁴⁰

The larger evolution of the term "environment" as a frame for spatialized visions of nature is complex and well beyond our treatment of the Indus basin here. That there was an important colonial backdrop to this evolution has been argued persuasively by Richard Grove, who traces the history of environment as a spatial concept to colonial writings about the interactions between people and nature within the distinctive contexts provided by bounded colonial islands.⁴¹ But it was the larger development of Darwinian thinking in late nineteenth-century Europe that first pushed the term toward its distinctive modern usage, critically linking the spatialization of nature to the spatialization of community. The mutually defining character of the terms "environment" and "community" can be seen, for example, in the emerging, late nineteenth-century concept of a "biological community" (*Lebensgemeinschaft*, or "living community," in its German origin), a community of organisms defined precisely by its dynamic, evolutionary relationship to its spatialized "natural" surroundings, its "environment," a relationship at once defined by the action of nature upon a "community" of organisms and by the actions of such organisms upon nature itself.⁴²

Relations between environment and community were thus bound up in the same reformulations of community marking the rise of political economy in British thinking more generally. But to track debates within the British administration

is not, of course, to describe how these played out on the ground. Among most Indus basin peoples, the action of “blood” (kinship), on the one hand, and the search for productive livelihoods dependent on water, on the other, intersected in complex ways that were shaped by influences often quite distinct from the debates marking the application of colonial political economy. Tribe and territory had long been viewed as operating in mutually constitutive ways in the Indus basin, and central to their interaction was the Indus basin’s most fundamental environmental reality, its productive *uncertainty*, a reality that operated on both the organization of production and the evolution of tribal community and that rendered their full conceptual separation impossible. In the context of Indus basin nature, it was thus the embedding of tribal calculation in the uncertainties of multiple, often unsettled modes of productive adaptation to arid environments that provided a critical backdrop to the operation of colonial ideas and policies, even as the new conceptual dichotomies of modern political economy took hold.

In such circumstances, the relationship between environment and community shaped the fundamentals of British statecraft on two intersecting levels. On one level, statecraft was powerfully molded by the multiple (and sometimes conflicted) meanings of community operating *within* British thinking (and state administration), meanings arising from the internal tensions of modern political economy itself. But colonial statecraft was shaped also, on another level, by the ongoing tensions *between* British framings of community and those of the Indus basin’s peoples themselves. The tensions defining British thinking were significantly complicated by the varied forms of community that they found on the ground. Although British projects for environmental change and settlement often forced indigenous groups to adapt to colonial structures, the internal fissures within colonial statecraft—particularly relating to the relationship of production and community—provided openings for Indus basin peoples to carve out for themselves significant arenas of independent action. These processes came together to define blood (a product of nature’s action in shaping “natural” communities) and water (a natural resource central to the construction of communities of production) as critical, intersecting elements in shaping the politics of the Indus basin’s great environmental transformation.

Telling the Story

In this book, we will trace these dynamics through the many phases of the Indus basin’s transformation in the years after 1850. We will begin with a case study of irrigation on the Indus basin’s Baloch frontier, where interactions between British ideas on political economy and existing forms of “tribalism” shaped an emerging imperial statecraft in the mid-nineteenth century (chapter 2). Here we can see the critical intersection between visions of tribal kinship and the construction of productive community in shaping colonial policy. The analysis then moves to the con-

flicting ideas about community and production that shaped the establishment of a distinctive, spatialized colonial property order in the Punjab, an order adapted to the two conceptually distinct forms of community emerging as central to colonial thinking. This was a property order shaped both by late nineteenth-century intellectual dynamics and by the reality of water scarcity and the constraints it imposed on production, particularly in the more arid regions of western Punjab (chapter 3). The critical intersections between conceptions of community and of environment were evident also in the development of new structures of water law in the region, which grew out of the same underlying dynamics shaping the property order. These structures of water law were to exercise a powerful, long-term influence on water development (chapter 4). Each of these chapters tracks the negotiations, both *within* the state and *between* state and society, that defined a developing colonial statecraft with respect to the control of water.

In the 1880s, the British began to move toward the large-scale irrigation projects that ultimately transformed the Indus region's landscape irrevocably. The construction of large perennial canals in the late nineteenth century defined a newly emerging environmental vision centered on a conception of the "river basin" itself as a technicalized, spatial entity, defined both by science and by nature. The story of this vision, and the conflicts it evoked, lies at the heart of the narrative of early twentieth-century irrigation expansion told in chapter 5. This was the era of the great Punjab canal colonies and the conquest of "wastelands" that they entailed. But it was also the era that crystalized the internal contradictions marking colonial statecraft and produced significant popular resistance, particularly during the canal colony protests of 1907. Those protests, and the official response to them, subsequently defined the distinctive frames for water politics that marked the years after 1920, when the evolving vision of the river basin as a spatialized environment came to intersect with new forms of colonial administration and electoral politics to influence new visions of provincial and "national" identity. These were processes that significantly shaped the national division of the Indus basin in 1947 (whatever its roots also in all-India politics), which divided not only the territory but also the waters of the river basin itself—a division formalized more than a decade later by the Indus Waters Treaty of 1960 (chapter 6).

Subsequently, the history of water control in the river basin evolved on two sides of an international border. But the history of water development in the last decades of the twentieth century hardly left behind the tensions between competing visions of community that had marked the colonial era. This was evident both in the structuring of internal, particularly provincial, water conflict (in India and Pakistan alike) and in continuing state-based debates about the relationship between politics and water development. These debates were deeply inflected by new intellectual currents within the field of knowledge that had been known in the nineteenth century as political economy. Central to the

structuring of the Indus basin's irrigation works remained the conflicted question of the role of "community" in the imagining of a structure of control over, and adaptation to, nature—and specifically to the dynamics of water—as the key to the politics of productive environmental transformation (chapter 7).

THE SETTING: THE INDUS BASIN

However much the history of the Indus basin's modern transformation tracks the large-scale tensions associated with modern ideas about production, community, and nature, it is also a history tightly bound to the distinctive, natural particularities of one, large, very specific South Asian region, the Indus basin. Aridity was the region's defining feature—and, as a result, nothing was more important to its long history than the role of water in defining the relationship of community to the land. Yet water is the most fluid of elements, as the British, like many before them, readily discovered. As Lacey put it in the 1950s, whatever the constant talk of "taming" the Indus basin's rivers, these "rivers were at all times very much alive."⁴³ They had, in a sense, minds of their own. Long before the arrival of the British, water's history provided a key to the structure of production and community in the region, even as its autonomous energy—a key also to the imagining of community—always lay, like the power of God, beyond man's full control.

The region drained by the Indus river and its tributaries is a large one (encompassing almost 1.2 million square kilometers), marked by considerable internal regional variation, particularly between the large, mountainous area drained by the Indus basin rivers in the north and the vast alluvial plains of the Punjab and Sind. The latter are the main focus of this study. Rainfall on these plains is very limited, diminishing as one moves toward the southwest away from the Himalayan foothills in the north. As a result, water from rivers has long been central to the history of agriculture. The greater part of the water in the Indus system comes from the annual monsoon runoff from the hills and from snow/glacial melt in the Himalayas. The waters of the five rivers of the Punjab—the Sutlej, Beas, Ravi, Chenab, and Jhelum—join the Indus from the east, whereas the Kabul river, draining snowmelt from the Hindu Kush, flows into the Indus from the west (see map 1). All these rivers show similar patterns of flow, and their vicissitudes have dictated much in the region's history.

Water's history in this region has largely been determined by high seasonal variation. With the bulk of the water in the system coming from rainfall and snowmelt in the mountains, slightly over 50 percent of the annual flow in the Indus rivers, on average, comes in the three months from July to September, when snowmelt is joined by flow from monsoon rains. An additional 30 percent comes from early melt in the period from April to June. Flow in the rivers in the six months from October to March is therefore minimal, constituting, on average, only

16 percent of the total annual flow. As a result, floods in the summer months were historically substantial, spreading, according to H. L. Uppal, on average twenty to twenty-five kilometers annually in the era before embanking on either side of the rivers, though this varied significantly from year to year.⁴⁴

Floods and Wells

Given this picture, the annual Indus floods have been a determinant factor in the history of the region. These floods were undoubtedly central to the earliest agriculture in the region, and they remained so until the early twentieth century, when perennial canals began to dominate the irrigation system. The Indus floods, though enabling agriculture, also constrained the ways that agriculture could spread and develop. This was due not only to the floods' variability but also to the Indus rivers' extremely high silt load. On the one hand, silt was central to the fertilizing capacity of the rivers, which helped to sustain agriculture for millennia. On the other hand, the heavy silt load of the rivers, carried down from the hills, had been responsible for the marked instability of the channels of the major Indus rivers on the plains, and thus for many of the problems in channeling Indus basin flows for irrigation.

The major rivers of the basin have shifted their courses repeatedly, sometimes dramatically, which has had a profound impact on the history of irrigation. We have no comprehensive history of these shifts, though evidence of ancient settlement on the now-disappeared course of the Ghaggar-Hakra, which flowed at one time parallel to the Indus all the way to the Arabian Sea, suggests the antiquity of the process. More recent evidence can be found in the still-visible evidence of old river beds, such as the old bed of the Beas running through the high bar of the Bari Doab in the Punjab, which was abandoned by the river when its flow was captured by the Sutlej in the second half of the eighteenth century, after many changes in course over the previous centuries.⁴⁵ Such old river beds are readily apparent in Sind, where a series of Indus courses, both to the east and to the west of the present bed, have been tracked through on-site inspection (and core samples) and aerial photography.⁴⁶ All of this suggests a highly dynamic process in which large-scale deposits from silt-laden floods were often associated with significant shifts in river course.

Indeed, modern accounts of flood-based agriculture suggest that it was rarely entirely fixed but was based on the shifting attempts to trap flood waters in enclosed basins, usually through the construction of small basin embankments (bunds). Such techniques, as observed in modern times, allowed cultivation to shift readily into new beds when flood basins were drained. The very nature of these techniques generally rendered the sowing of summer *kharif* (or hot weather) crops difficult in the most arid parts of the region, allowing usually only a single *rabi* (or cold weather) crop after flood waters subsided and saturated the ground.⁴⁷

Such flood-based agricultural techniques were also probably supplemented early on by irrigation from wells. The presence of brick-lined wells in ancient Indus valley cities suggests the advanced state of well-building technology from a very early time. Yet there seems to be little evidence that such wells were actually used for irrigation. Rather, *kaccha* (unlined) wells were probably dug to supplement receding flood waters. As one official noted at the end of the nineteenth century, “[T]hese wells are quickly and inexpensively made and roughly fitted with a rope and bucket. The principal crop grown on them is barley, and when this has been reaped the wells are deserted and often fall in.” The connection with shifting flood waters was critical: “The area irrigated from wells varies considerably from year to year. When the floods fail the people devote all their energy to their wells, but again when the floods are favorable they sow a great deal of land with the help of the floods and then irrigate a large proportion of it from the wells, and the best crops are most easily got on land which has been moistened and rendered fit for sowing by the river floods and has afterwards had its supply of moisture kept up by irrigation from a well.”⁴⁸

Such wells played an important role in relations between agriculture and pastoral animal herders. Pastoral movements in the Indus basin have historically taken many forms and included transhumant migrations between plains and hills.⁴⁹ But circulation with flocks between the interior areas of the plains, away from the rivers, and the riverine areas was also common and was largely dictated by the same seasonality of the floods that shaped agriculture.⁵⁰ Herders circulated in the higher interfluvial plains (the *bar*), following the best grass in the cold weather, but moved back toward the rivers during the hot weather. They too dug wells to water their herds as flood waters receded and grass appeared in the extensive areas left behind. Although there have undoubtedly been wide variations in such relationships over time—and in different parts of this large area—the close relationship between pastoralism and agriculture within an arid environment defines one of the most important long-term determinants of the Indus basin’s history.

The relationship is also critical to the complex history of wells in the region. The importance of technical innovation in wells for the history of the Indus basin has been forcefully argued by Irfan Habib, who contends that the introduction and diffusion of the Persian wheel in the pre-Mughal period was responsible for a dramatic transformation in relationships to the Indus basin environment, “leading in due course to the considerable influx of previously pastoral elements into the ranks of the peasantry,” particularly the Jats, who had over the centuries migrated from the lower Indus basin into the Punjab. The key to this transformation lay in the linking of animal power to irrigation, which made possible a shift in relations to the land toward permanent agricultural settlement.⁵¹ Central to Habib’s argument is the assumption that the constraints on extending cultivation outside river flood zones (or onto lands with marginal availability of rainfall in the north, where

rainfall was higher) had lain in the limitations of human labor in working wells to produce enough water to make full-time agriculture on such lands a paying proposition. New well technologies that tapped into labor-saving animal power thus proved critical in fostering what could be called the Indus basin's increasing "peasantization" in the centuries preceding the arrival of the British.

Chetan Singh has critiqued much of Habib's argument, suggesting that the Persian wheel was itself a technology constrained by the need for a relatively high water table. Singh highlights his argument by comparing the Persian wheel with another, older form of Indus basin well irrigation that had also depended on animal power, the *charsa*, which used an ox on a ramp to raise water with a leather bucket linked to a rope and pulley; as Singh argues, this was more effective in raising water from greater depths due to its lighter apparatus.⁵² Singh does not tell us very much about the history of the *charsa* itself as a technological innovation in applying animal power to irrigation, but his critique is nevertheless important in alerting us to the ways that technologies of well irrigation in the Indus basin have long been closely related to the specific circumstances of particular sorts of local environments.⁵³ Persian wheels were hardly effectively adapted to all the Indus basin's water conditions, and they were problematic where water was too deep or where land was subject to floods, which could damage the significant investment involved in the gearing and woodwork of a wheel. But their extensive diffusion in the Indus basin nevertheless indicates their critical importance as a labor-saving device in a region where land remained plentiful whereas water and labor scarcities jointly restricted the practicality of irrigation.⁵⁴ This was particularly true in the regions beyond—but not too far beyond—the limits of the rivers' normal flood action, where the water table was relatively high (and sweet), and it was in this environmental zone, and in areas of higher rainfall toward the mountains and in central Punjab, that the impact of the Persian wheel was greatest.⁵⁵

It would be a mistake, however, to see the history of wells as shaping a one-way shift from pastoralism to agriculture—and toward "peasantization"—for the two were long related in the Indus basin environment, and expanding agriculture hardly ended this relationship. Persian wheels encouraged the expansion of agriculture precisely in areas between the flood zone and the high bar that often abutted grazing zones. Not only did the use of animals on wells therefore link farmers to pastoral cattle suppliers in new ways, but in some areas Persian wheels themselves became an important adjunct to pastoral livelihoods, rather than opening out an *alternative* of "peasant" settlement.⁵⁶ As Neeladri Bhattacharya puts it, even as they "settled villages, cleared forests and ploughed the soil," Jats often maintained connections to pastoral grazing and cattle-keeping "as an integral part of their economic activity."⁵⁷ The very patterns of well construction and land clearance, which were often undertaken by lineage segments of larger pastoral groups, encouraged and shaped these ongoing connections, particularly in central Punjab.

Such evidence suggests the important relations between pastoralism and agriculture in shaping forms of local community in the region. Habib emphasizes that the word Jat itself, a term originally associated with pastoralism (and still so associated in parts of the Indus basin), came ultimately to be synonymous with a “villager” in central Punjab, thus suggesting the ways that an earlier pastoral culture carried over to influence the distinctive culture of settled Jat communities in the Punjab—and may, in fact, have influenced the Punjabi Jat affinity for Sikhism.⁵⁸ Singh has similarly explored the ways that “tribal” cultures of genealogical reckoning in the Mughal period linked pastoral and agricultural communities together across the divide of settlement.⁵⁹ Yet if such connections suggested the powerful influence on settled Indus basin communities of a pastoral history defined by genealogical reckonings, the spread of the Persian wheel may have encouraged new forms of productive “community” in the upper Indus basin as well, particularly as collective, share-based investment in Persian wheels probably played an important role in defining joint interests in well water that were linked in many cases more to the business of production than to “tribal” or genealogical connections.⁶⁰ The complex relationship between genealogical identity, “tribal” leadership, and the mitigation of productive uncertainty across multiple, uncertain environments will be examined in more detail in the next chapter on the Baloch frontier. The distinction between productive and nonproductive forms of community is not one that can be easily projected backwards from the colonial intellectual framework (or even that captured effectively the actual operation of well-based shareholding under the British). Yet the complex and conflicted roles of wells in processes of Indus basin settlement, and in collective action, became an important subject in British debates on the relationship between environment and community in the nineteenth century, as we shall see.

Canals

The impact of the spread of the Persian wheel was closely linked to the history of canal building in many parts of the Indus basin, a process with considerable direct state involvement. In fact, the history of canals in the Indus basin before the time of the Mughals is a surprisingly uncertain one. There is little evidence of canal construction in ancient times, possibly because the distinction between canal construction and attempts to channel water within creeks or abandoned river channels as floods rose and fell was a very fine line.⁶¹ Certainly, small canal irrigation works existed early on in lands to the west, particularly on the more stable streams at the higher elevations of Afghanistan and other areas on the fringes of the Indus basin.⁶² There is evidence, for example, of ancient canal works in the Swat valley. It is very likely that small-scale forms of collective action shaped efforts to canalize inundation waters on the plains as well. But it is by no means certain when the first large canals on the Indus plains were constructed. The challenge of large-scale

canal construction in the Indus basin lay in the distinctive conditions of the Indus rivers, including the high seasonal variability in flow, the shifting character of river channels, and the very high silt load of the rivers, which led to the rapid silting of canal channels. All these factors defined serious constraints, particularly in terms of labor, on canal building. Canals of any size required considerable and—most critically—ongoing investment of resources and labor, which often involved state action. As a result their history is, not surprisingly, closely intertwined with the history of state building in the region.

As Iqtidar Husain Siddiqui argues, the earliest evidence of large-scale canal building comes from the Delhi Sultanate period, during which there is some sign of canals in the Multan and Sind regions.⁶³ Delhi Sultanate and Mughal-era canals suggest clearly the imperatives of state building that were involved, particularly in regions close to their capitals. Some of the most important canals of this era, particularly in eastern and central Punjab, involved major state investment for moving water to support important urban building projects that were clearly undertaken to underscore state building and royal power.⁶⁴ This was, at least in part, the case with the fourteenth-century canals of Firoz Shah Tughluq, which took water from both the Sutlej and the Jamuna (in the Ganges basin) to support projects in Delhi and Hissar. The same motives played a role in later Mughal attempts to reconstruct and expand these canals, as it did in Shah Jahan's construction of the important Hasli canal, which brought water from the Ravi river to Lahore in central Punjab for the Shalimar gardens and other projects. Although most of these projects attempted to make use of old river beds and channels, they still involved considerable investments of money and labor.

Similarly, the history of canals in providing irrigation for agriculture was complex. While driven in part by urban projects, it is clear that these canals also involved the significant provision of irrigation water to rural cultivators along their routes. A recognition of the importance of investment in irrigation in order to expand cultivation was deeply embedded in Mughal revenue practice. In part, this took the form of long-term remissions of revenue in order to encourage land grantees to extend cultivation by sinking wells and opening cultivation on new lands, a process that may well have played an important role in some areas in the expansion of irrigation by Persian wheels (though, as Habib notes, evidence on this is limited).⁶⁵ Such policies also extended to the patronage of smaller scale canals, which were sometimes undertaken by local zamindars or local officials, with the encouragement of the state (and with *sanads*, or authorizations, from the Mughal state, sometimes promising revenue concessions in return for such enterprise). One example of such a canal was the Shah Nahr canal in Hoshiarpur district, built by the local enterprise of a zamindar under the authority of a later Mughal, early eighteenth-century sanad.⁶⁶ There is also evidence of regional rulers within a Mughal tributary regime undertaking new initiatives in canal building

farther to the southwest in the Indus basin, such as the Mirranis of Dera Ghazi Khan (who will be discussed in more detail in the next chapter).

Such concerns also led to the development of bureaucratic practices for managing canal water. Documents mention in some cases the appointment of canal superintendents (*mir-i ab*) for particular canal projects or particular areas. Habib notes, for example, the existence of a directive appointing a *mir-i ab* for canals in the province of Multan, which empowered him to “dig new channels (*nala*), clear the old channels, and erect bunds on flood-torrents (*band-i sail*)” and to see to the equitable distribution of canal water among cultivators.⁶⁷ But we know little about how (or whether) this was implemented. Closer to Delhi, documents detailing plans for the resuscitation of older canals in Haryana during Akbar’s and Shah Jahan’s reigns mention the role of the *mir-i ab* (assisted by a *maimar*, or architect/mason) in mobilizing zamindars for canal construction, supported by local officials.⁶⁸ Yet, as Habib makes clear, the limited quantity of such evidence suggests, perhaps, the generally limited bureaucratic attention to canals within the overall Mughal system.

The most important evidence with respect to the intersection between state policy and local initiative in canal construction in the precolonial period comes from the post-Mughal period, immediately preceding the arrival of the British, when much of the Indus basin witnessed a significant intensification of canal construction. This was touched off by the emergence of a number of regional Indus basin states in the years after the invasion of Nadir Shah in 1739—states whose resource bases came to be linked far more closely to canal construction and management than was the case with the Mughals. Nadir Shah’s invasion detached all the lands west of the Indus from the Mughal empire and laid the foundations not only for the rise in Afghanistan of the powerful Durrani empire of Ahmad Shah Abdali but also for the emergence of a series of regional frontier states in the Indus valley—the Kalhoras in Sind, the Daudpotras in Bahawalpur, the successors of the Mirranis in Dera Ghazi Khan, and the Afghan Saddozai Nawabs in Multan—all of whom were to become major sponsors of canal building as they sought to consolidate their regional power.

Central to the processes of canal construction in this era were the new economic realities shaping the eighteenth-century Indus basin, which, in combination with existing ecological pressures, created a new framework for inundation canal investment. The rise of the Durrani empire to the west opened up new opportunities for trade with both Afghanistan and Iran, and this had a critical impact on all of these regional states. The emergence of Shikarpur in Upper Sind as the center in the eighteenth century for a far-flung system of trade and finance was associated with the growth of communities of Shikarpuri (and other Hindu) traders in Multan, Bahawalpur, and other regional centers who played important roles in the finances of all the new regional Indus valley states of this period (see map 2). The position of these merchants was also linked to trade and to the local

production of certain commercial crops, most notably indigo, which were grown during the kharif season.⁶⁹ Pressure to expand kharif production for commercial and revenue purposes played a critical role in new inundation canal investment. Rulers whose revenues depended on indigo in the kharif season—and on close relations with Hindu traders—had strong incentives to develop an effective supply of inundation canal water to lands immediately beyond the reach of the floods, since these crops could not be easily grown with floodwater or well water alone during the hot season (as few animal-powered wells could be effectively run in the hot weather in these areas without some additional canal water supplies).⁷⁰ Irrigation canal investment thus went hand in hand with the expansion of commercial cash cropping during this era, as was perhaps most dramatically illustrated by the early nineteenth-century Sikh governor of Multan, Diwan Sawan Mal, who realized, as one British official later put it, that “the successful production of indigo depended on an early, plentiful, and constant supply of water.”⁷¹

Successful canal building depended also—and perhaps most essentially—on effective strategies of labor mobilization, as this was the most significant constraint on canal building in the Indus basin’s arid conditions. And here the relationship of these canals to the Indus basin’s preexisting pastoral and well-based structures of environmental adaptation was critical. The common strategy for canal building in this era was to mobilize labor by offering shares in canal water to those with control of (or claims in) preexisting wells along a new canal’s projected route if they would participate in the process of canal construction. Later British officials sometimes described these processes as mobilizing “the owners of the lands which that section was intended to irrigate,”⁷² but in fact they were less owners of measured quantities of land (which meant little in such extremely arid areas) than men with claims to rights to irrigate based on previous links to fluid processes of well construction. Many of these wells were seemingly abandoned, or worked intermittently—indeed, many were probably associated with semi-pastoralists who used them both to water animals and for temporary or periodic cultivation. But canal builders organized those with such claims into canal sections (usually known as *dakhs*) to provide labor for constructing the canal. “Directly the proprietors of the soil hear” of a proposed canal project, one British official wrote, describing an earlier project on the western bank of the Indus, they begin to return, even though “dispersed over Bahawalpur and elsewhere.”⁷³ Such labor was then “assembled by authority when the excavation of a canal was commenced, and generally supplied either with a certain monthly cash sum or with a seer of flour a day by the state.”⁷⁴ This was hardly a market wage, for the real return on this labor was the right of each participant to claim a share in the water of the finished canals for previously intermittently cultivated (or abandoned) well lands.

Such structures were critical also for providing a framework of rights for incorporating men of capital and key political players into the canal-building process.

Since canal building was closely linked in this era to an expansion of commercialized production, rulers used the processes of demarcating shares for access to water (and for mobilizing labor) to incorporate men with commercial connections into the process. Deeds from the Manka canal on the west bank of the Indus, for example, which was extended in the 1760s, show shareholders admitting Hindus to half shares in wells and canal sections in return for their providing capital to excavate the canal and open cultivation.⁷⁵ Even more common, particularly along the Chenab and Sutlej, were what were known as *chakdari* tenures, whereby investors, usually Hindus, gained productive control over land in return for supplying the capital to open cultivation, paying subsequently only a small yearly proprietary fee. Although such tenures were defined by investment in Persian wheels (the name, in fact, literally referring—at least according to some—to the wooden structure of a wheel), they spread rapidly on canal lands, where wells carried rights to canal water, and canal water allowed them to invest in the production of commercial crops.⁷⁶ Such tenures seem to have expanded particularly rapidly in the late eighteenth and early nineteenth centuries in Multan, where Diwan Sawan Mal encouraged Hindu settlement as he linked a direct state role in commercial marketing with a role in encouraging expanding cash crop production on canal lands.⁷⁷ Canal-building arrangements structured around wells thus fostered not only labor mobilization but also the capital needed to make canals paying propositions.

Such technologies of canal construction also served political purposes, accommodating the settlement of state functionaries or grantees, another critical aspect of the relationship of canal construction to state building. This was probably illustrated best by the example of Bahawalpur. The founders of the new Bahawalpur state in the eighteenth century were part of a warrior clan from Shikarpur in Sind, who, after conflicts with the Kalhoras, established themselves in the region south of the confluence of the Sutlej and the Chenab near the holy city of Uchh. For the Nawabs of Bahawalpur, the establishment of regional authority depended on the control of Daudpotra kinsmen and military elites, which required a rapid expansion of cultivable land for distribution to critical allies and supporters, thus suggesting how important a tool canal construction was for regional state building.⁷⁸ The earliest Bahawalpur canals were built by competing Daudpotra chiefs, but by the end of the century the nawab of Bahawalpur had consolidated his power largely by settling Daudpotra and other military *jagirdars* (grantees) on new canal lands all along the Sutlej.⁷⁹

Such canal construction processes were important generally for assimilating existing local power holders into these new systems of political authority. Baloch tribal chiefs played roles in canal construction on the west bank of the Indus, for example (as will be discussed further in chapter 2), as did, in a few cases, the custodians of Sufi shrines in the region.⁸⁰ Sufi shrines were important institutions over much of the Indus basin, often located at the intersections between pastoralism

and settlement, or at critical nodes on trading routes. Shrines were thus important fixed points of authority in an only partially settled environment. Perhaps the most interesting case of a Sufi shrine-based leader playing a critical role in canal excavation was that of the *makhdum* of Sitpur, who himself sponsored an important canal in the 1740s. The Sitpur *makhdum* was part of a large group of Bukhari Sayyids, descendants of Sayyid Jalal ud-Din Bukhari of Uchh, whose shrines were found all over southwestern Punjab and Bahawalpur. Although the Sitpur shrine was itself a small one, the family of the *makhdums* had gained an important place in local affairs as counselors to local rulers of Sitpur dating back to the sixteenth century.⁸¹ But, in the wake of the invasions of Nadir Shah, they used the authority of a large land grant direct from the Durrani to build a large canal west of the Indus to water this grant. This was, of course, a way for the Durrani to assert their own influence in the region, extending their authority through the patronizing of a prominent family of locally influential Sayyids. However, in using the demarcation of canal sections to draw local Jats into the canal-building process, the Sitpur *makhdums* were able to greatly extend their own local income and influence, before their lands were later absorbed by the Nawabs of Bahawalpur in the late eighteenth century, a development facilitated by a later shift in the Indus river's course.⁸²

The processes of canal construction that marked this era may not have been entirely new, but their importance in the second half of the eighteenth century and the first half of the nineteenth century provided a critical backdrop to the history of canal building and management under the British. Many of these canals were major undertakings. Although they varied greatly in size, some were relatively large, running twenty miles or more at oblique angles from the rivers to water higher ground. By the early nineteenth century, canal irrigation—though closely integrated with irrigation from wells and with the rivers' annual floods—had thus become central to Indus basin cultivation.

Nevertheless, stabilizing this structure of canal operation proved a very difficult proposition, suggesting once again the critical importance of large-scale labor mobilization—and of state power—to canal operation in this environment. Shifting conditions on the Indus rivers continually threatened canal operation as the annual floods spread and river channels shifted. Major shifts in river courses periodically separated canals altogether from river channels and rendered them useless, as happened ultimately, for example, to the *makhdum* of Sitpur's canal on the Indus. More frequently, shifts in channels required canal heads on the rivers to be repeatedly realigned and reconstructed.⁸³ But the greatest ongoing threat to the operation of canals lay in the annual accumulation of silt in the channels, and it was here that eighteenth- and early nineteenth-century Indus basin rulers proved most effective in developing administrative techniques for ongoing labor mobilization to keep canals in operation.

The key to such mobilization lay in the continuing administrative replication in the organization of annual silt clearance of those structures that had defined the original act of canal building itself. Filled every spring by the rise of the silt-laden waters of the Indus rivers, such canals required yearly silt clearance when the water receded in winter, otherwise they would slowly—or in some cases, very quickly—silt up and cease to irrigate. The importance of this was magnified by the fact that the commercial return from these canals depended less on the total volume of water that came with the rising rivers in the summer than on the dates from which the canals began to run in the spring and ceased running in the fall as the Indus waters rose and fell. The success of commercial cropping depended on the effectiveness of the silt clearance that took place in the winter.

Labor requirements for annual silt clearances were very large, and such labor was normally supplied through the organization of what was known in many areas as the *chher* system, a levy of unpaid laborers who cleared the canals each winter. Such efforts were generally (though not always) organized under bureaucratized state supervision and generally included state-appointed *mirabs* (watermasters), *darogas* (work superintendents), and *muharrirs* (accountants). But a critical fact was that the responsibility for supplying such labor was apportioned on the irrigators themselves. Distributed according to canal shares (whether calculated by wells, as was most common, or by irrigated area, or by canal sections), silt clearance labor was thus provided by the irrigators or their tenants, or in some cases by laborers who were paid from a fund (*zar-i nagha*) filled by those who chose to pay a commutation fee rather than to supply labor themselves.⁸⁴ This system varied in different areas; in some there were local *panchayats* (or “Moonsiffs or Assessors, selected from among the chief men”) who helped to distribute the demand for labor over the canal.⁸⁵ But canal labor, though normally overseen by state officials, was generally mobilized and legitimized in this system through a conceptual interlinking of labor obligations and annual rights to canal water, a structure of reciprocal obligation that defined, in the eyes of some later observers, a “shareholding community” of irrigators (a concept whose dynamics will be discussed further in chapter 4).

Such systems were, of course, marked by many tensions, both among the irrigators and between the irrigators and the state. The collection of *chhers* (usually in December when flow in canals had ceased) and distribution of *chher* labor along the length of canals was often a subject of conflict, as the process could easily favor irrigators at various places along the canals, particularly those at the head whose labor contribution to canal clearance sometimes ended with the clearance of the upper reaches of a canal. State officials also at times favored for political reasons some irrigators over others.⁸⁶ Still, the basic outlines of the *chher* system represented, arguably, a yearly recreation of the system by which the canal had been originally constructed, expressing not only the importance of the supervisory

authority of the state but also the primary claims of those who had actually built and gained shares in the canal. These, in turn, were embedded not only in the political relations defining the state but also in the distinctive environmental realities of the localities, including levels of aridity, variability of water flows, and the complex relationships between pastoralism and agriculture and between wells and canals, all of which potentially served to facilitate or inhibit local cooperation and community.

CONCLUSION

As the history of canal development in the mid-Indus basin suggests, expanding commercial production, environmental constraints, and state building were thus central to shaping canal development—well before the arrival of the British. Also central were the tensions between state control and direction of canal operation and the reciprocal rights and obligations shaping what might be called local “irrigating communities.” That these tensions sometimes reflected back on the moral authority of precolonial states was suggested by a nineteenth-century folktale about the canals of the nawab of Bahawalpur. Sitting in his court one day, Nawab Bahawal Khan was supposed to have bragged to his courtiers that his canals always ran well—a result of his own superior management. But that night, the great medieval Muslim saint Makhdum Jahanian Jehangasht, the “Traveler,” the grandson of Sayyid Jalal ud-Din Bukhari of Uchh, was supposed to have come to the nawab in a dream, walking up and down the bank of a canal with a spade—the tool of a *chher* laborer—on his shoulder. Speaking to the nawab, the saint admonished him for his bragging: “My son, you sit in your court and boast that the canals are flowing through your good management,” the saint declared, “but without me [lit., without the kindness of the *fakir*], what would you know about management?”⁸⁷ On one level, the nawab’s dream could be interpreted in conventional terms as a warning, underscoring that, when it came to the supply of water, no human management could undo nature’s autonomy—or operate independently of God’s will and the grace of the saints. But, on another level, the saint’s admonitions, in the guise of a *chher* laborer, suggested the morally complex relationship between the authority of the ruler and the local “community” of irrigators (the suppliers of *chhers*), here seemingly embodied in the saint’s autonomous voice. Without the provision of *chher* labor—mobilized through the reciprocities shaping the “community” of irrigators themselves—few canals could have effectively functioned, whatever the ruler’s role.

If moral tensions between the authority of the ruler and the bonds of reciprocity shaping canal irrigation were evident even before the arrival to the British, these took on new meaning within the discourses of colonial statecraft in the years after 1850. Indeed, for the British, such tensions came to be caught up in the larger

intersections of state authority and local community shaping intellectual debates in Europe in the second half of the nineteenth century. From the time of their arrival in the Indus basin, the British were engaged in reconciling the management of irrigation systems to their own understandings of state authority and to the differing visions of “community” with which that authority was associated. With its pastoral history, the Indus basin was viewed by the British as the South Asian home of “tribal community” par excellence: communities rooted in kinship and genealogical calculation. But it was also a region in which new technologies of water control, linked to commercial production, offered the keys to new forms of political power (and new visions of political economy). Indeed, conceptualizing the meaning of “community” in respect to irrigation matters came to be a central—and much debated—element in the structuring of colonial statecraft in the region, inescapably linked, as we shall see, to the basic foundations of colonial rule.

Irrigation and the Baloch Frontier

There is but one good thing in the world, the cause of violent disputes and wars a hundred times over. Everyone comes and throws it on himself, and yet I see nowhere any wound. Attend, wise man, and guess this verse rightly.

—BALOCH RIDDLE¹

The history of the Raj's northwest, trans-Indus frontier has often been told in terms of the turbulent history of the "great game" in Britain's imperial history. But water's long-term centrality to political control was evident all along India's northwestern frontier.² Control of water was to prove central to British imperial state making in the region, as it had been to earlier states as well. But it also came to be intimately related to the larger intellectual processes through which the British sought to define the foundations and meanings of their empire in its relationship both to the environments and to the structures of community they encountered.

To illustrate the early efforts of the British to come to terms with this environment, this chapter will focus on the Baloch frontier, the trans-Indus region dominated by the Baloch people, facing the Sulaiman range. We can see here an example of the role of frontiers in what has sometimes been called "ethnogenesis," the processes by which identities have been created or transformed by frontier interactions.³ This is not to say that Baloch identities were in any sense created by these interactions. Rather, the argument is that both Baloch and British imperial identities were powerfully molded by the encounter between British officials and Baloch that was played out in relationship to forms of control over the natural environment—and to forms of "tribal" identity related to it. For the Baloch, control over the productive environment—in which water was central—had long shaped distinctive forms of "tribal" history. But for the British, too, who confronted the trans-Indus Indian frontier in the mid-nineteenth century just as they were defining the principles of high colonialism and national identity, conflicts over irrigation highlighted the developing intersection between attempts to order nature and, through that very process, to order community. In the years before the launching of

the great irrigation projects that were to transform the Punjab and Sind, in other words, the principles (and the tensions) that were to define the history of Indus basin irrigation were dramatically rehearsed in the establishment of British colonial power along the Indus basin frontier.

WATER, PASTORALISM, AND BALOCH IDENTITY

The focus of this case study is an area stretching 200 miles along the right bank of the Indus river from the Derajat to Upper Sind. In climate, the region was an extremely arid one, with rainfall at Dera Ghazi Khan averaging only a bit more than six inches a year and showing a very high degree of variability. Though an area of mixed population when the British arrived, the people of the region were predominantly Baloch and Pakhtun, with the Baloch predominating in the hills to the south (Upper Sind and Dera Ghazi Khan) and Pakhtuns in the north (Dera Ismail Khan). Baloch and Pakhtun tribal organization shaped political loyalties in the hills of the region, with most of the tribes practicing some combination of pastoral herding, agriculture, trade, and raiding as foundations for their livelihoods. It was in the southern half of this area that significant canal investment along the Indus began to shape British frontier policy, first on the far side of the Sulaiman range in Upper Sind and then, more significantly, along the Dera Ghazi Khan frontier to the north (see map 2). Baloch tribes dominated both these frontiers, and, in the decades following the British annexation, the British began to use irrigation there as a central element in their efforts to establish a policy of frontier definition and control.

Irrigated agriculture and Baloch identity did not often go together in the images that filled early British writing. As Frederick Fryer wrote in the 1870s, “[T]he Bilo-ches are robust and manly, but they look upon war as their trade, and despise agriculture and the arts of peace.”⁴ The late nineteenth century produced a large literature on the Baloch that often cast them in terms of the “savage” and the “untamed,” an image directly associated with tribal raiding and a lack of settlement. As Simanti Dutta has written in her study of British attitudes toward the Baloch, they were often viewed as a product of their particular environment: “Exposed to the rigours of wild mountains and deserts that circled India to the northwest,” they were widely viewed as “predatory, primitive and alien.”⁵ Such stereotypes often flew in the face of the reality, noted even in early British travelers’ accounts, that agriculture also played a role in Baloch life. But as even close observers, such as the later anthropologist Robert Pehrson noted, it was pastoralism that shaped most deeply the culture of the Baloch, including their own self-image. Pastoralism played the central role, Pehrson argues, in defining the Baloch customs and political institutions within which Baloch culture (and “Balochness”) found its clearest expression.⁶

Nevertheless, no history of Baloch relations with the Indus plains—and with the emerging empire of the British—is possible without attention to the role of irrigated agriculture in Baloch life. Even in the hills, forms of irrigation (and agriculture) were critical to Baloch organization and can be discussed in terms of essentially three types of water control. Of first importance were Baloch irrigation works tied to the perennially flowing, spring-fed streams found in the mountain valleys of the Sulaiman range. Although the flow of most of these streams was restricted (and disappeared in the heat of the lowlands before reaching the Indus), the agriculture from *kalapani* irrigation (also called *syap* in Balochi—that is, irrigation from “black water,” clear, perennially running streams as opposed to silt-filled torrents) was important to the structure of many tribes. The relative stability of *kalapani* irrigation in an arid environment encouraged the emergence of fairly elaborate, if relatively small, systems of watercourses, with distribution calculated often on the basis of water shares based on timed water use.⁷ Equally important, it also provided a relatively stable, if limited, agricultural base supporting the establishment of small towns as the seats of tribal chiefs, which served as small markets and centers for networks of pastoral circulation in the hills.⁸ Commerce (and monetary transactions) were normally handled at these markets by Hindu traders, who were protected “as a point of honour” by Baloch chiefs, thus suggesting their importance to tribal organization and chiefly authority.⁹ In allowing for fixed points of tribal settlement amid pastoral circulation, *kalapani* irrigation thus played an important role in the wider circulation of pastoralists in the hills—and in the structuring of chiefly leadership—however limited the absolute agricultural volume and value of *kalapani* production in relationship to pastoral products.

Kalapani irrigation was supplemented in many parts of the Baloch hill country by a second form of water control, *karez*, or underground watercourses carrying water through tunnels dug into the slopes of hills. *Karez* were, in the words of the author of the 1907 Loralai district gazetteer, “a very ancient method of artificial irrigation” in Baluchistan and were widely used. But they were more common in the central and western parts of Baloch territories, which were most strongly influenced by Iran (where such underground watercourses were known as *qanat*). Constructed sometimes by powerful individuals, who paid to have them periodically cleaned out by itinerant laborers, and sometimes (like Persian wheels) by communities of co-sharers who jointly maintained them, they were of some importance locally but played a limited role in the environmental adaptations of the Baloch occupying the hills overlooking the Indus plains.¹⁰

More important generally to the ecological adaptation of the tribes of the Dera-jat was a third type of water control, irrigation from torrents, practiced in response to the uncertain patterns of rainfall reaching the hills of the region. The construction of small *bands*, or earthen dams to trap water after periodic rains, was common throughout the hills. Cultivation was most fully developed on the torrents

that dominated the skirts (*daman*) of the mountains all along the Derajat frontier. Though dry during most of the year, these torrents filled with silt-laden, fertilizing water following spring rains in March–April and monsoon rains in July–August, allowing crops to be sown on inundated lands. This torrent-dependent agriculture was called *rodkohi* cultivation. Distributaries from each torrent were filled by the construction of *bands* at the distributary mouths, which were broken in turn to allow water to pass to distributaries further down the torrent once higher lands were thoroughly inundated. This required also the construction of high earthen embankments around fields (known as *laths*), which were necessary to deeply soak the plots, catching the silt and readying the fields for planting. At least minimal cooperation was required between those who controlled the various distributaries on these torrents, as *bands* had to be built and broken in a controlled sequence.¹¹

Such cooperation was not always easy to attain, particularly as the actual fields irrigated often shifted from year to year. Most torrents operated on the basis of a customary distinction between upper irrigators (*moond* or *saroba*) and lower irrigators (*pand* or *paina*), the upper irrigators having the right to take as much water as they required before the lower irrigators were allowed to break the upper dams to bring the water down to their own distributaries. But, since torrents were highly unpredictable, shifting their courses and sometimes bringing water down from the hills so powerfully that dams were suddenly and unexpectedly broken, stable cooperative arrangements around these torrents were difficult. Conflicts were so frequent, as one British official noted, that “every attempted dam was known as *khuni band* (bloody dam).”¹² Sometimes tribal ties provided the basis for cooperation. Many distributaries were dominated by (and named after) the tribal lineages that had originally built them.¹³ In some cases, Baloch *sardars*, leaders of tribal sections, or others controlled large quantities of land on these torrents and exercised strong influence on their organization. Often, however, cooperative arrangements were dictated by the needs of mixed groups of cultivators, who, as the first regular British settlement officer of Dera Ghazi Khan put it, appointed their own local officials, whom they called *maimars*, to oversee the planning and construction of dams and subsequent distribution and cooperative dam breaking on the torrents. Such torrents operated independently from any direct control by tribal leaders.

Despite its varying forms, *rodkohi* cultivation bore a critical relationship to Baloch tribal life, for it was not only the most remunerative form of irrigation in the hills but also one of the most variable, and it was thus of necessity closely integrated with other forms of environmental adaptation, notably pastoralism. As one early British official, Major C. C. Minchin, estimated, *rodkohi* cultivation was so uncertain in the Derajat that preparing fields for cultivation could be looked on as a speculative endeavor; it was only, on average, one year in three that such labor paid off in a significant return. But when successful, as Minchin also noted, “the

produce of one good year will more than cover the losses of the other two years.”¹⁴ In its very nature, therefore, this form of cultivation was the province of a generally mobile population, and one usually as dependent on cattle as on agriculture.¹⁵ Cultivators lived, according to Fryer, in “scattered encampments”¹⁶ and kept herds that could be taken to the Indus flood plain to graze when rodkahi cultivation failed. Protection provided by tribal leaders, who could guarantee access to grazing land for cattle and provide support in lean years (sometimes through raiding expeditions) was thus critical to the rodkahi cultivation’s widespread practice. For their part, tribal leaders, including not only Baloch sardars but also their *mukaddams* (or heads of tribal sections), benefited significantly from the high returns from torrent cultivation in good years, for they were usually able to claim a significant share of the produce. When the torrents failed, they underscored their chiefly position among their tribesmen by making grain or cash advances¹⁷ or by organizing tribal raiding parties.

The uncertainty associated with rodkahi cultivation thus underscored one of the critical dynamics that shaped Baloch tribal organization. Although forms of water control were central to Baloch adaptation, communities of water control on the frontier were rarely self-contained and were often composed of semi-pastoralists and temporary cultivators, who depended on political and ecological relationships extending well beyond the structures of water control that supported agriculture. Stability and protection in Baloch life depended on structures of political solidarity transcending attachments to the land, for few strategies of settled production offered fully certain returns. Baloch political organization was structured, therefore, by an ideology of segmentary descent that was, in its actual invocation, closely tied to the variability of the environment and yet, in its conceptual structure, independent of any *particular* form of environmental adaptation, thus offering to Baloch households protection in a shifting and uncertain world of both pastoralism and cultivation. Reliance on the “natural” idiom of blood and tribal connection (however culturally constructed) was critically important, in other words, as a counterpoint to the lack of fixity in the physical environment itself. The operation of “tribal” solidarity as a form of community was powerfully related to the competitive pressures of environment and tribal enmity growing out of competition for scarce resources, including grazing grounds and, most particularly, water.¹⁸

Indeed, the strength of tribal organization lay in the power of “blood” to shape a world of reciprocal obligations stretching across the boundaries of pastoralism and settlement. Although kinship ties structured the social organization of small Baloch pastoral bands, they played a different role within the larger and more diverse world of the Baloch sardars or tribal chiefs. With few secure sources of water in the hills (apart from limited centers of kalapani and highly variable rodkahi irrigation), Baloch tribal chiefs tended only rarely to control stable

hierarchies of authority within fixed landed boundaries. To the contrary, the authority of chiefs was constrained by the influence of segmentary section chiefs, who were themselves constrained by the “elders of the section they represent.”¹⁹ Chiefs and followers were bound largely by an ideology of reciprocal obligation, adapted to their highly uncertain environment, but articulated in terms of genealogical obligation.²⁰ Chiefs needed the support of their followers to be successful raiders and to provide access to grazing grounds and water, and in return they made it possible for Baloch men to support their households. Nothing captured the protective power of a Baloch chief more clearly, therefore, than the symbolism of his generosity and hospitality to his fellow tribesmen. Lavish generosity, of course, also required wealth, which itself tended to legitimize chiefly authority, as did heroic leadership in raids, which could bring in booty. Successful management of trade and relations with states could also greatly enhance a chief’s reputation, for it provided critical income and sometimes access to employment for tribesmen. This is why the protection of Hindu commercial men was so important. Whatever the economic foundations, it was the promise of protection for uncertain livelihoods that energized Baloch tribal loyalties and gave meaning to chiefly claims to authority based on heroic genealogies. Tribal leadership—and the idiom of blood—thus operated in counterpoint to the uncertainty, and the diversity, of the Baloch environment.

In practice, of course, tribal configurations could rapidly change in such circumstances, as the history of Baloch tribes along the Dera Ghazi Khan frontier indicated. In some circumstances, new members were readily attached to tribal groups in response to environmental or political pressures, assimilating to an ideology of genealogy and “blood” connection over time.²¹ Chiefs and their followers frequently responded to shortages of water or limitations in grazing grounds by pushing into new territories, searching for new productive environments. Given these patterns, no account of Baloch environmental adaptations can remain confined to the hills. Baloch interactions with the Indus plains date at least back to the fifteenth century, and probably much earlier. Virtually from its earliest recordings, Baloch history and tribal organization were shaped not only by the search for grazing grounds in the proximity of the Indus river but also by the potential availability of irrigation water that could, given the right environmental and political circumstances, be channeled directly from the Indus river.

The Baloch and Canals on the Indus Plains

The story of Baloch interaction with the plains begins with the stories of Baloch migration that, in many crucial respects, brought modern Baloch identity into existence. As Longworth Dames has argued, the great Baloch migration out of Mekran and into both the Sulaiman range and the Indus plains in the fifteenth and sixteenth centuries was preserved in Baloch ballads as something of a “national

migration,” a charter for Baloch ethnic identity after a period of intense internal strife, probably precipitated by environmental crisis.²² Initially, it was probably the recruitment of Baloch chiefs into the military service of Indus plains states in this era, including the Langahs in Multan, the Mughals, and a series of states in Sind, that opened the Indus plains to this migration, though the nature of these migrations changed over time.²³ Many ballads thus charted the exploits of the great tribal chiefs, such as Mir Chakar Rind, who, according to tradition, after a bitter tribal war led the Baloch into the plains. Chakar, along with his son, was said (perhaps apocryphally) to have aided Babur and Humayun in securing the Delhi throne, and he lived on in Baloch legends as the image of an ideal chief.²⁴ However, elements in these ballads also suggested the connection between the memory of this great migration and the importance of the reciprocal obligation that bound chiefs and their followers. Whereas migrations were markers on one level of chiefly heroism, they were, on another level, the sign of the failure of chiefly protection. “The Rinds and Lasharis [Baloch tribes of the time] made a bond together,” one poem of the migration thus declared, “and said: ‘Come, let us leave this barren land; let us spy out the running streams and sweet waters, and distribute them among us; let us take no heed of tribe or chief.’”²⁵ It was only as a result of their success in securing access to such “streams and sweet waters” (and grazing grounds) that chiefs established legitimate claims to leadership and heroic credentials.

The impact of such migrations on Baloch tribal organization and culture was thus mixed: in some cases, access to new resources strengthened tribal leadership, but, in others, the movement onto the plains led to dispersal and a loss of cohesion. Although many Baloch leaders gained powerful positions with the states of Sind and southwestern Punjab in the following centuries, waves of Baloch migrations in their wake left Baloch settlements scattered by the nineteenth century over much of western Punjab, Sind, and elsewhere. Chakar and his descendants eventually received land grants from the Mughals, particularly in the Punjab.²⁶ In the eighteenth century, the Kalhoras in Sind offered numerous grants to Baloch, some perhaps related to canal construction, thus laying the groundwork for the emergence of a powerful class of Baloch military jagirdars in Sind, a class from which the Talpur Mirs, themselves Baloch, ultimately emerged as rulers of Sind in the late eighteenth century.²⁷ But there was a tendency over the centuries, in these circumstances, for many Baloch migrants to Punjab and Sind to become increasingly assimilated into Punjabi and Sindi culture, a tendency particularly marked in the western Punjab.²⁸ “Those who followed Chakur [that is, who migrated to Sind and Punjab] have become Jatts,” a Baloch proverb declared, “while those who stayed behind have remained Baloches.”²⁹ The proverb hinted at a process both of deculturation and of peasantization that was associated with migration to the plains.

Yet it was also the emergence of new *connections* between the hills and the plains that was to leave a powerful influence on reformulations of Baloch identity.

Indeed, for the tribes that continued to occupy the hills, developments on the plains just below the Sulaiman range proved critically important, for it was here that inundation canal construction emerged as another vital element in the complex of Baloch environmental adaptations during this period. The key to this was the development of an important regional state on the Indus in the sixteenth century controlled by the Mirrani Baloch of Dera Ghazi Khan, a polity that came to occupy the region between the Indus flood plain and the hills. Ghazi Khan Mirrani, of the Dodai branch of the Baloch, had come to the plains in the fifteenth century in the train of Dodai leaders taking service with the Langahs at Multan, and he had later established himself (probably with a state land grant) on the Indus; he was, according to Fryer, “a great cattle-owner” who was “attracted by the grass.”³⁰ But to establish a foundation for his authority, he began to construct small inundation canals from the Indus and to patronize the spread of agriculture on the plains as a more stable source of wealth. Water was, of course, plentiful in the Indus riverain during the summer floods, but permanent settlements were not. The floods of the Indus were notoriously fickle in the mid-Indus region, and the direction and nature of the floods (and of their silt deposits) varied from year to year, rendering flood-based cultivation and fixed agricultural settlements precarious, even with the supplemental use of wells. As the *A'in-i Akbari* observed in the sixteenth century, “The river Sind (Indus) inclines every few years alternately to its southern and northern banks and the village cultivation follows its course.”³¹ Wells certainly existed (both kaccha and Persian wheels); the plains were probably dotted with wells associated with temporary cultivation and with the herds brought down to the Indus riverain by pastoralists.³² But only by building inundation canals from the Indus to water lands beyond the direct reach of the floods were the Mirranis able to establish a relatively fixed agricultural base for themselves in this very dry area, and in the process to transform the political foundations for their authority. According to the *A'in-i Akbari*, the Mirranis commanded by the end of the sixteenth century a brick fort, a large army, a substantial revenue, and an important position as a small tributary state within the Mughal state system.³³

Inundation canal construction linked the Mirranis simultaneously into the larger world of Indian power relations and into the world of power relations shaping Baloch life in the hills. The sociopolitical technology that established the new canals of Dera Ghazi Khan may have come in part from models provided by the Mughal empire, but it derived equally from the ongoing interaction between pastoralism and agriculture that had long shaped Baloch affairs. In fact, in their canal-building strategies, the Mirranis appear to have been forerunners of the later regional states of the eighteenth century who adopted similar strategies to expand canal irrigation significantly in this region. Much of what we know comes from traditions (and documents) collected by the British in the mid-nineteenth century—and most of these related to the expansion of canal building in the region

that came in response to the later, eighteenth-century rise of the Durrani empire. But many local traditions linked the beginnings of significant canal building in the area to the rise of the Mirranis more than a century earlier. In seeking to secure their power on the plains, like later rulers, the Mirranis seem to have projected the routes of potential canals largely along routes defined by the presence of preexisting wells, associated not generally with long-settled cultivators (for village communities were very few on the Dera Ghazi Khan plains) but rather with semi-pastoralists, both Jats and Baloch who had regularly taken their cattle to the riverain to graze and who also practiced temporary well-assisted cultivation. Many of these were men who probably already had considerable experience with the temporary and uncertain *rodkahi* cultivation practiced on hill torrents. But the key to the Mirranis' success lay in their drawing labor from both the plains and the hills into the canal-building process.

Like later eighteenth-century canal builders, the Mirranis tapped into mobile plains labor by defining wells as the foundations for projected claims to water on new excavation projects. As Fryer described the process, the Mirranis assembled those who laid claims to these wells and paid them a monthly cash sum (or its equivalent in flour) while digging the canal, usually dividing the work into sections (*dakhs*) and assembling those who had claims (based on old wells) on each section for the work. But they also used grants of land to draw Baloch from the hills onto these canals, both under the leadership of tribal chiefs or lineage segment heads and as mixed communities. "When the canal was dug," Fryer wrote, "the branch canals and cuttings were made by the people themselves, who divided the water by their own committees, and each proprietor became the owner of an estate possessing the advantage of canal irrigation, as a return either for his own labor in excavating a portion of the canal, or else as a return for the capital he had sunk in paying some one else to dig his share of the canal."³⁴ Such branch canals thus helped to establish new communities defined by their relationship to water, but in many cases these cuttings were also taken up under the authority of Baloch tribal chiefs and served to emphasize their authority.

The incorporation of Baloch leaders into these canal systems on the plains played an important role in stabilizing the Mirranis' power. The Khosa chief, for example, married into the family of the Mirranis, who gave him a grant of land on the plains, through which a canal (called the *Haibatwah*) was later constructed.³⁵ In the south of Dera Ghazi Khan, both the Mazari and the *Drishak* chiefs were given wasteland grants and excavated canals or canal branches that allowed their tribesmen to move in large numbers to the plains. The Mazaris had "long brought their cattle down every winter to graze near the Indus," but they moved in large numbers to the plains after the Mazari chief, or *tumandar*, excavated a canal known as the *Hamalwah*, perhaps initially in the seventeenth century, on the tract of land between *Rojhan* and the Indus. Such connections continued in the

eighteenth century, even as the Mirranis declined, as in the case of the Drishaks. As Fryer described it, “an ancestor of the present Dreeshek Tomandar, excavated [the Mobarik branch of the Dhoondee, the makhдум of Sitpur’s canal] for the use of his own tribe,” thus gaining an agricultural foothold on the plains in the mid-eighteenth century.³⁶

Investment by Hindu men of capital was also an integral and important part of this process. How important this investment was to the process in the early Mirrani period, during the Mughal era, is difficult to say. But the British found substantial evidence of the importance of such investment in the reconstruction and expansion of many of these canals in the mid-eighteenth century. It was particularly evident after Mahmud Gujar, a former *wazir* (minister) of the Mirranis, seized power from the Mirranis with the support of the Durrani and launched a new program of canal construction and reexcavation. Rulers and Baloch chiefs alike obtained money to open new land in part by mortgaging (and sometimes selling) rights in canal lands to traders, many of whom were interested in the commercial crops—particularly indigo—that could be grown on canal lands. Although most evidence for this is relatively late (from the eighteenth century), it appears that the later Mirranis channeled capital into canal projects by recognizing what were known as *adhlapī* tenures on canals, tenures shaped by the original claimants to canal sections agreeing to give up to outsiders half of their land (and, presumably, of their claims on canal water) in return for the provision of capital or labor to excavate the required section of the canal and to open cultivation. Early British officials unearthed deeds confirming such arrangements dating from the 1740s and 1750s onward; one deed transferred *adhlapī* rights on the Manka canal to certain Hindus, “in consideration of donees supplying the dhuk or section of the excavations assigned to donors by the Nawab (Ghazee Khan [Mirrani]).” Such relations appear to have been even more important in the late eighteenth century with respect to Mahmud Gujar’s and the makhдум of Sitpur’s canals.³⁷

Such mortgages and sales were also linked to the transformation of the town of Dera Ghazi Khan in the mid-eighteenth century into an important commercial center, linked to the trade to Kandahar and Kabul. Afghan and Shikarpuri Hindu traders emerged as an important presence in the town. As Alexander Burnes noted in the 1830s, the town had once been known along with Shikarpur as one of the “gates of Khorasan.” That Hindu capital found its way into agricultural production on canal lands is suggested by the importance of indigo in canal production on the better inundation canals, a crop that also played an important role in the town’s exports, and one in which traders usually had a high stake.³⁸ Relations between Baloch who controlled canal branches and Hindu men of capital were also probably quite close. Documents collected by the British in the mid-nineteenth century for one small indigo and cotton-producing canal, for example, showed that the entire canal, along with its watercourses, was mortgaged in the early nineteenth

century to one Bhae Oodo Dass Shekarporia, before being remortgaged, in the 1840s, to an important Baloch chief.³⁹

Perhaps most important to the power of the Mirranis and their successors, however, canal construction played a critical role also in shaping the extremely dangerous relationship of the state to the hill Baloch, whose presence had a continuing influence on the politics of the plains. For Baloch leaders with large followings in the hills, access to irrigated canal lands added an important new element in potentially stabilizing their leadership. But their position depended also on their ongoing ability to mobilize tribesmen for raiding in order to protect both grazing grounds and water sources in the hills—and to maintain some degree of autonomy in relationship with states on the plains. In the time of Mahmud Gujar, for example, the Drishak chief was granted revenue rights over a portion of the villages on the Dhundi canal but only after a bitter feud with Mahmud Khan in which, as Richard Bruce relates it, the Drishak had raided near Dera Ghazi Khan to steal cattle, killed Mahmud Khan's brother, and defeated a force sent against them.⁴⁰ States sometimes tried to take advantage of the continuing military influence of these chiefs. Bruce records, for example, that during the time of Ahmad Shah Durani, the Gurchani chief (and his leading mukaddams) were offered the right to collect the government share of the produce (*masul*) in kind on several villages on the plains and to collect a tax on camels coming into the plains in return for the safety of the Hurrund and Dajil frontier. It was because of this, as Lepel Griffin and C. F. Massy write, that the Gurchani chief "moved down into the plains, and built himself a fort at Lalgarrh, where the Gurchani chiefs now live."⁴¹

Nevertheless, settlement on the plains hardly guaranteed full state control over such a chief's power. Intensified bargaining between hill chiefs and plains states produced new structures of organization during this period. As Dames argues, this period of agricultural expansion on the plains was also the period in which the organized *tumans* (tribes), each with its own state-recognized chief (or tumandar), had crystallized in the adjacent hills, a process suggesting the increasingly close interactions with plains states that characterized the period. For many of the emerging tumandars, an irrigated agricultural base in the plains came to be as important as one derived from kalapani- or rodkahi-based agriculture in the hills or daman. But the role of tumandars as assertive military leaders in the hills, commanding the military allegiance of tribal sections while protecting Baloch grazing grounds and dispensing largesse, remained a central element in Baloch organization, whatever their relations with the plains. Just as it defined the power of the state, multiple relationships to the environment continued to define Baloch chiefly power and tribal identity.⁴²

Nothing suggested this more clearly than the conflicts that erupted in the face of a general breakdown in canal irrigation on the Dera Ghazi Khan plains in the late eighteenth and early nineteenth centuries. At the heart of this was the major

shift in the course of the Indus that occurred about 1790 as the river broke through its right bank south of Kinjur and moved to a more westerly course, shifting its junction with the Chenab from a site south of Shahr Sultan to a site near Mithankot, about sixty miles downstream.⁴³ The effects of this shift on the operation of nearly all the canals in the southern part of the Derajat was devastating. As Bruce notes, “[T]he heads of the Bisharut and other canals in the south of the district were carried completely away; while inundations which had never been known before overspread the face of the country from the north to the south,” in the process disrupting cultivation completely in many of the canal villages of the region. Decaying canals had, of course, been reconstructed before. But now the disruption of irrigation on the plains was associated with a period of significant conflict among the Baloch. Not coincidentally, as Bruce observes, “it was about the same period that the Belooches, who had gained a firm footing in the plains, commenced that series of wars and blood feuds which lasted for over forty years, and devastated the country.”⁴⁴

It is impossible to draw a direct correlation between the increase in conflict among the frontier Baloch and the shift of the Indus, because this period was also one of escalating conflict within Baluchistan after the death of Nasir Khan of Kalat, and on the plains between the nawabs of Bahawalpur, the Talpur Mirs in Sind, the Durranis, and the Sikhs, which strongly influenced conflict along the frontier. But the conjunction of a serious environmental disruption with a time of considerable political conflict on the plains suggested the close interaction between environmental and political factors in shaping Baloch organization. With the disintegration of an effective state at Dera Ghazi Khan, it was impossible to reconstitute the social structures for resuscitating or reconstructing the canals. The results were not only increasing conflicts among the Baloch tribes over access to resources but also, in many cases, challenges to tribal leadership as the environmental foundations of many of the tumans were disrupted. Many of the conflicts of this period involved both resource competition between Baloch tribes and leadership struggles within particular tumans, with states on the plains using alliances with some tribes to defeat others, and rivals within tribes using alliances with other tribes to gain state recognition as tumandar within their own tribes.

The nature of the conflicts of this era were in part captured by the Baloch ballads of the era (later collected by Dames), many celebrating the valor of tribal chiefs and heroes who fought over territory, water, and grazing grounds. Each tribe claimed its own “lands and running water, wealth and cattle.” But it was the self-assertion of the tribes in battle that in effect validated their status and helped to legitimize their myths of common descent, even as new leaders and new tribal configurations emerged. Chiefs tried to emphasize their own steadfastness and traditions of valor as they summoned their warriors from different tribal segments, calling, as did the chief of the Tibbi Lund, “to my whole tribe, from the hills

to the rich lands of the plains” to assemble to defend their territory. In a ballad extolling the heroism of the Lunds, for example, the warriors of the tribe fought “like mighty warriors of old” against their enemies, the language of the ballad suggesting their tribal identification with both pastoral and agricultural resources: “Thronging forth like a herd of cattle, . . . the heroes of the Lunds and Gurchanis came together [for battle] as the water of a torrent comes against an embankment.”⁴⁵ But the stories of both warriors and chiefs, which emphasized above all bravery and success as the markers of tribal identity, suggested the fluidity of Baloch political configurations even within a context in which claims to heroic genealogy defined the legitimate currency of assertions of tribal unity. Not all tribal segments, of course, always united readily, particularly in the face of different patterns of relations to the productive environment and of potential alliances with states and other tribes. Indeed, the establishment of unity remained an evanescent ideal extolled in many ballads, a measure itself of the strength and virtue of a Baloch chief.

Some tumans disappeared entirely under the pressures of this period, facing both concerted attacks from other tribes and the loss of their ecological base, their members dispersing and attaching themselves to other groups. As Bruce notes, the Jistkanis, who held land on the Shoree Nullah, “were not able to hold their own on their former lands” and, having lost both their tumandar and their environmental base, “broke up and scattered themselves amongst all the other Beloch tribes,” partly under pressure from the Drishaks, who had themselves lost much of their irrigated agricultural base on the plains. Similarly, the Hussanis, who lived on the Nisao plain in the hills, were besieged by both the Drishaks and the Marris, and after the death of their tumandar broke into parts that joined other tribes, losing, in the process, their “name and place amongst the Beloch tribes.”⁴⁶ An important group of Hussanis attached themselves as a segment to the Khetrans, a tuman composed of a number of segments of differing origins, which, though without lands on the plains, emerged as an increasingly important tribe in this era as a result of their base in the Barkhan valley in the hills and as a result of their increasingly important role in marketing raided property and directing trade between the hills and the plains.

When the British arrived on the Baloch frontier, they thus found a region in flux. As Bruce wrote: “At annexation the whole of Dera Ghazee Khan District was marked by immense jungle tracts, which were found intersected with lines of old canals, and the remains of what had once been large flourishing villages.”⁴⁷ This situation was worse in the south of Dera Ghazi Khan than in the north, which had escaped the most serious effects of the shift in the Indus. Diwan Sawan Mal had also done much to try to improve the canals and stabilize the country north of Dera Ghazi Khan in the 1830s.⁴⁸ As elsewhere, the British probably exaggerated the disorder they encountered on their arrival on the frontier in order to underscore

their own moral claims to authority. Nevertheless, the evidence of irrigation's political importance in an earlier era of Baloch history was evident on the plains for the British to see.

BRITISH IRRIGATION AND THE MYTH OF THE BALOCH FRONTIER

But as the British established their control along the Indus frontier in the 1840s and 1850s, their approach to irrigation reflected a vision shaped largely by their self-image as "civilizing" colonial rulers and their image of the Baloch as quintessentially nomadic. As they moved into the Indus basin in the mid-nineteenth century, many British observers tended to view the emerging colonial frontier as a moral divider separating the advance of civilization from the turbulent world of Baloch "marauding." British ideas were partly shaped by the fact that their first encounters with the Baloch were on the Upper Sind frontier, facing the hill areas of the Sulaiman range held by the Marri and Bugti tribes, who had been far less involved in canal building on the plains than those tribes occupying the hills facing the Punjab to the north.⁴⁹ But they were also shaped by deep-seated assumptions rooted in developing social theory in Britain.

The wealth of both the Marri and the Bugti lay overwhelmingly in their flocks, which were susceptible to raiding not only by other tribes but also by each other. Although the two tribes controlled some limited kalapani and torrent irrigation in the hills, they did not hold significant canal lands. The area below the Sulaiman range, which on the Sind side fell away to the west at almost right angles to the Indus, was open to large uncontrolled river inundations that, before the construction of the Kashmor *band*, sometimes inundated the entire country as far as Shikarpur, thus rendering canal operation extremely uncertain and difficult. At the time of the British arrival, the Marri-Bugti hills were thus separated from the areas of settled cultivation in Upper Sind by an approximately thirty-mile strip of largely uncultivated desert. The Talpur Mirs of Sind (themselves Baloch by origin) had attempted to control raiding by these hill Baloch largely, as H. T. Lambrick put it, by hiring "Baluchis of one tribe to guard their borders against Baluchis of another."⁵⁰ In confronting these Baloch in the years immediately following annexation, early British administrators sought initially to control the Marri-Bugti frontier themselves largely through military operations and punitive expeditions.

But some British officials quickly came to see irrigation and agriculture as a civilizing instrument that could be critically important in stabilizing the frontier. Although many British observers were well aware of the importance of water resources and irrigation to the Baloch, such as had shaped relations of the Dera Ghazi Khan frontier, their early reactions remind us of the powerful hold on many British officials in that era of a vision of the spread of agriculture (and thus of irri-

gation) that was centrally linked to ideas of moral progress. Many were influenced by the views of Enlightenment thinkers like Adam Smith, who had seen pastoralism within a frame of evolutionary progress in which agriculture naturally superseded nomadic pastoralism as a stage of civilization. They were hardly completely oblivious to the complex histories that had shaped Baloch relationships with the plains (and with Indus basin agriculture) in the decades before their arrival, but many found it difficult to see the Baloch—and the imperial frontier—in anything but such evolutionary moral terms. In such a light, nomadism and settled agriculture were antithetical systems. This was particularly noteworthy in early dealings with the Marri and the Bugti on the Upper Sind frontier, as these were groups overwhelming reliant on cattle and on raiding.

No one held to such a vision more clearly than John Jacob, whose influence dominated the Upper Sind frontier in the late 1840s and 1850s. For Jacob, who was also initially involved in brutal military operations against the Marri and the Bugti, the demarcation of a clear “moral” frontier between civilization and the “roving” cattle keepers of the hills was important not only to controlling the frontier but also in defining the very legitimacy of British power. In this light, irrigated agriculture was both a form of production superior to the nomadic Baloch life and a necessary instrument of its transformation. Jacob thus saw the development of irrigation not as part of a complex world in which pastoralism and agriculture were interconnected but rather in terms of a world where agriculture was associated, as Jacob’s biographer Lambrick puts it, with that critical ideal of contemporary political economy and intellectual desire: the emergence of “the Economic Man.”⁵¹ Nothing was therefore more important for the progress of Sind than the construction of roads, bridges, and—most of all—canals, which defined a world in Sind cast in sharp juxtaposition to the Baloch world across the frontier.

Central to efforts to control the Baloch, in such a worldview, were thus efforts to resettle them on irrigated lands in Sind itself as a key instrument for controlling the border as well as for morally transforming the Baloch. The first British attempt to force the settlement of hill Baloch in the plains as a mechanism of control came after Sir Charles Napier’s 1845 military expedition into the hills shortly after annexation.⁵² After defeating several small Baloch tribes in a military campaign, Napier sought to solidify British victory by resettling key groups of defeated Baloch on the plains. It was Jacob, however, who stressed most strongly the use of irrigation as the key to separate the Baloch from the hills in order to assimilate them to an imperial order. In both a physical and a moral sense, only the complete immersion of formerly hill Baloch in irrigated agriculture could achieve, in Jacob’s view, the definitive separation of these Baloch raiders from their wandering life in the hills—and thus underscore the power of the new British order as a civilizing force. Jacob criticized the early results of Napier’s efforts, which, having failed to give proper attention to irrigation, failed also to break decisively the links of settled

Baloch to the hills.⁵³ Taking them into hand, Jacob sought to disarm and immobilize them (allowing only the chiefs and a small body of guides in government service to leave periodically) while organizing them for the clearance of an old channel of the Begari canal, the Nurwah (a channel originally dug by Sind's eighteenth-century Kalthora rulers⁵⁴), to bring adequate canal water to their lands. For Jacob, this was the key to the whole policy. Nothing expressed Jacob's concern more clearly, as he put it himself, than the vision of Baloch "digging merrily at a canal."⁵⁵ "From the time they took to agriculture," Jacob wrote, "they were really conquered and commenced to be reformed."⁵⁶

The same policy animated much of early British relations with the Bugti tribe, in spite of the difficulties that Bugti resettlement policies encountered. After the military defeat of the Bugti tumandar in 1847, Jacob himself took a hand in encouraging the settlement of the Bugti chief and his followers on the plains, urging their separation (both physically and morally) from the life of the hills. Indeed, having moved a group of Bugtis led by the tumandar to a settlement on revenue-free lands near Larkana, the government began almost immediately to organize them in the opening of an old canal to bring an adequate water supply to their lands and to engage them in the discipline of irrigated farming. But, from the beginning, the history of the settlement was troubled. Within a year, the tumandar, Islam Khan Bugti, had fled the settlement and, in defiance of the British, returned to the hills. For some officials, this event suggested simply that the degree of physical separation from the hills at Larkana had been inadequate to facilitate the transformation. Larkana was situated too near the frontier, they argued, and they recommended moving the Bugtis yet farther from the frontier, to lower Sind. But the dilemmas in the process of forced settlement were summed up more generally by Bartle Frere, the commissioner in Sind: the Larkana settlement, he noted, was "far enough from the border, and sufficiently surrounded by comparatively civilized and well disposed cultivators, for the colonists to feel they were strangers and exiles, a marked and distrusted people in the midst of temptation to thieve and be idle; yet not far enough to prevent their keeping up all their old border connections and feelings." Indeed, Frere's comments suggested the intended subversion of tribal distinctiveness and identity that lay at the heart of this British settlement policy.⁵⁷

Experience with the Bugtis indicated the problems inherent in forced separation from the hills as an expression of the British vision of transformative irrigated settlement, and it attracted increasing criticism and skepticism from administrators in the ensuing decades. But this did not mean that the vision of irrigated agriculture as a foil to the life of the hills was in any sense abandoned. The influence of the frontier on Sind irrigation development in this era proved to be substantial. The first major canal project undertaken by the British in Sind was Jacob's scheme for the rehabilitation of the Begari canal, for which the Bombay government sanctioned Rs. 130,000 in 1852. The canal, which ran roughly along the border between

Upper Sind Frontier and Sukkur districts, was intended when reexcavated to provide water for repopulating Upper Sind Frontier district as a settled bulwark against the insecurity of the hills (from which the canal was separated by an intervening desert tract). The concern for a cordon along the frontier drove yet more centrally Jacob's subsequent proposal for a new Desert canal, running through the desert north of the Begari and much nearer the Baloch hills. The foundations for the canal were begun when a small zamindari watercourse from the Indus was acquired by the government and extended into the desert in the late 1850s. For various reasons, the completion of the canal was delayed until the 1870s. But Jacob's commitment to the project proved unswerving. As James Outram wrote to reassure Jacob, "Twill yet be done I trust, and the desert annihilated; tempting the hill tribes to become solely cultivators of the plain."⁵⁸ Indeed, the moral power of irrigation to reclaim the Baloch, drawing them from the "predatory" roving life of the hills, remained central to the official ideology of the project. "From the time when Sind was first taken by the British Government," a later Irrigation Department report declared in discussing the origins of the Desert canal, "it has always been the object of the authorities to induce the roving predatory Baluch tribes, inhabiting the Bugti hills, the desert at the foot of them, and portions of the Upper Sind Frontier District, to take to peaceful agricultural pursuits."⁵⁹

The importance of the frontier in shaping Jacob's thinking on irrigation generally became clear when he was named acting commissioner in Sind in the mid-1850s. By that time, Frere, under pressure from Jacob, had reconstituted the Sind Canal Department as an agency committed to progress and rationalization in the management of canals. A Canal and Forest Department had originally been established shortly after Sind's annexation by Napier, who had put a military officer, Lt.-Col. Walter Scott, in charge of overseeing the rehabilitation and development of Sind's existing canals. But in the face of inadequate finances, limited engineering knowledge, and continuing military concerns on the border, the department was disbanded in 1849, "without," as Aitken puts it, "anything having been accomplished."⁶⁰ But the sanctioning of a new and reorganized Canal Department in 1854 suggested the influence of Jacob's view that irrigation, particularly in its relationship to the frontier, was central in defining the basic boundaries and principles of the British regime.⁶¹ For Jacob, irrigation was a marker of the transformative powers of empire as a progressive institution. It was through institutional reform, administrative skill, and technical knowledge—projected as the antithesis of what lay across the border—that a structure of order could best be erected to bring the Baloch into this imperial system and define the legitimizing foundations of a British imperial state.

Such views were also reflected in Jacob's vision of irrigation administration itself. Among his most important acts as acting commissioner was his decree in 1856 abolishing the use of "statute labour" on all Sind canals. The long-standing role of statute

labor in Indus basin canal operation was complex, and it was further complicated by debates on the interpretation of the *chher* labor system (discussed in chapter 1). But for Jacob, the issue was straightforward. British reliance on the mobilization of unpaid canal labor was unacceptable because it undercut the powerful linking of irrigation development with the advance of natural laws and political economy. Not only was statute labor a “great evil, crushing energy [and] stopping real improvement,” in Jacob’s words, but its use also threatened to undermine irrigation’s transformative cultural meaning. If annual labor was needed for canal silt clearance (which it was), then, in his view, it was best to contract for it and pay hired laborers a market wage.⁶² For Jacob, the configuration of settled, peaceful, irrigated agriculture, in opposition to the uncivilized life of the Baloch in the hills, was thus linked to a system of administrative control based on rationalized principles. It was rational administration—and military power—that would provide order as the laws of political economy and “civilization” were given room to operate.

The Expansion of Irrigation in Dera Ghazi Khan

Such ideas were powerful and influential. But they jostled uneasily with the more complex reality of irrigation in the middle Indus basin. As even Jacob himself realized, irrigation played a more complex role in Baloch life than could be encapsulated within such a simple progressive narrative, associating irrigation with moral transformation. Undoubtedly, juxtapositions of agriculture against pastoralism (as civilizational stages) continued to play a powerful role in shaping British thinking right up to the end of the nineteenth century and beyond. But British policy was driven by the intersection of these ideas with the more immediate realities of administration.

In Sind itself, where large numbers of Baloch had settled on the plains over the previous centuries, British administrators increasingly discovered that connections between the hills and the plains were numerous, as were connections between agriculture and pastoralism. This was readily evident in police reports in the Upper Sind frontier, where officials commented on the interaction between settled agriculture and cattle stealing linked to the hills.⁶³ Equally important, many British realized that interests in agriculture on the plains were of considerable potential importance to structures of tribal authority in the hills. Thus, when the Desert canal was completed in the 1870s, the British distributed grants of irrigated land to many Bugti from the hills, which were not intended so much to encourage the abandonment of pastoralism in favor of settlement as to reduce reliance on plunder by shoring up the income of headmen within the different sections of the tribe engaged in trans-border pastoralism. Such grants prompted considerable debate among Sind authorities about whether permanent residence on these lands should be required. But, in the end, many grants were made that did not require permanent residence. Islam Khan Bugti, for example, the *tumandar* at one time confined

on the plains, was himself ultimately given a *jagir* (land grant) that did not require his residence, as was his grandson, Shahbaz Khan Bugti, the future head of the tribe and a man later central to British frontier policy, who came to control a separate branch canal.⁶⁴ Control over canal lands thus became an element in shoring up the authority of Baloch chiefs, whose modes of environmental adaptation continued to rest primarily on the practice of pastoralism.

The contradictions in frontier irrigation found fullest expression, however, in British policies along the Dera Ghazi Khan frontier farther north, annexed to the British empire with the Punjab in 1849. There, as we have seen, many Baloch chiefs and their tribes had long straddled the frontier. Although there were large areas of completely uncultivated lands between the Indus and the hills, a far narrower desert cordon separated the hills from the plains in the Punjab than on the Sind side of the Sulaiman range. Baloch from the hills had, under the Mirranis and their successors, played important roles in canal construction on the plains, in addition to controlling *rodkohi* and *kalapani* cultivation in the hills.

Just as in Sind, however, many Punjab officials initially saw the definition of a frontier barrier between settled society and the hills as critical to the projection of imperial control. As the deputy commissioner of Dera Ghazi Khan noted in the late 1850s, the extension of cultivation was central to the definition of such a barrier: "It is the immense tracts of waste and jungle that render it so easy for hill marauders to leave the passes and penetrate unobserved for many miles towards the river, returning with stolen cattle to the thick jungle, and during the following night to the hills. . . . Every new settlement renders this kind of theft more precarious, and reduces the labor of our police."⁶⁵ The construction in the 1850s of major *bands* along the Indus in Dera Ghazi Khan was intended not only to protect, for military reasons, the Dera Ghazi Khan cantonment and station (which were carried away by a major flood in 1856) but also to encourage the spread of agriculture, by protecting irrigation works from the effects of floods.⁶⁶ Punjab also saw the establishment in 1854 of a Public Works department, which included a branch for Irrigation Works under the authority of a chief engineer, which, as in Sind, was intended to flag irrigation development on the plains as a distinctive marker of British technical expertise and imperial rule. Irrigation and military security were thus strongly linked in the 1850s, as they were in Sind, in defining a line of protection from the hills, even though schemes for government expenditure to improve and extend Dera Ghazi Khan inundation canals were repeatedly rejected in the mid- and late 1850s for want of funds.⁶⁷

But British policy in Dera Ghazi Khan eventually came to depend on irrigation not just to define a line separating the plains from the hills but also, far more than in Sind, as an element drawing Baloch leaders into both settlement and direct canal investments on the plains—and thus more directly into the ambit of British authority. This policy was shaped by Minchin, who took control of Dera Ghazi Khan as deputy

commissioner in 1860. Minchin's comments on early British military forays against the Bozdar, a predominantly pastoral tribe occupying the north of the Dera Ghazi Khan frontier, suggested his awareness of the complexity of the relationship between pastoralism and agriculture in defining British relations with frontier Baloch chiefs. The British initially viewed the Bozdar, at annexation a tribe confined largely to the hills, as "inveterate plunderers and cattle thieves"⁶⁸ (in spite of their controlling several rent-free villages on the plains originally given to them by Diwan Sawan Mal). But, after an expedition against them in the late 1850s revealed that they also controlled considerable kalapani cultivation in the hills, Minchin saw the British as possessing levers of control over them. Irrigated agriculture drew them inevitably into the orbit of British power. "We have the whole game in our hands now that we have visited and surveyed their country," Minchin wrote. "We have not only learnt the road into their country, but also the fact that it contains valuable crops, the destruction of which causes more loss than the plunder of several seasons could compensate for." Minchin thus recommended that the Bozdar be given additional lands in the plains to strengthen further the British hand.⁶⁹ The lesson of the Bozdar was that the key to controlling the tribes lay not in separating the chiefs from the hills but in drawing them into the framework of British administration and investment in agriculture (and irrigation) by taking advantage of the role that agriculture had long played in Baloch power and tribal life itself.

Minchin thus launched a policy in the early 1860s encouraging direct, voluntary canal investment on the plains by Baloch chiefs themselves; this was intended to build on the role that agriculture already played in Baloch society. To provide an example to others, Minchin initially turned to Mussoo Khan Nutkani, a wealthy Baloch chief from the north of Dera Ghazi Khan who had been closely allied with the Sikhs before annexation and who already had large agricultural investments on the plains. Though Mussoo Khan's canal (the Massuwah) was only partially successful, his example nevertheless soon attracted the attention of others (see map 3).⁷⁰ Several chiefs now promised, as Minchin put it, "to excavate new canals or extend old ones, the cost to be defrayed by the applicants, who solicit only the rent-free lease for a term of years . . . of the waste lands to be brought under cultivation by these canals."⁷¹ As Sir James B. Lyall later wrote, "The leading men of the district were persuaded, in some cases not erroneously, that with his [Minchin's] assistance they were going to make their fortunes by [canal construction and] canal extensions."⁷²

Baloch chiefs, of course, had their own reasons for investing in canal projects. Though these reasons varied, in most cases the attraction of canal investment in the plains related directly to the jockeying for chiefly power that characterized most of the Baloch tribal systems in the hills. For Baloch chiefs, leadership, though cast in the language of genealogy, was always a matter of reciprocity and negotiation. For many chiefs, or aspirants to chiefly power, control over stable agricultural

income was a key element in the exercise of the largesse necessary to command tribal authority (and to maintain the access to credit necessary for such largesse). The dynamics of ongoing competition for leadership within the Baloch tribes provided the framework in which much of the Baloch interest in voluntary canal investment emerged, particularly after the British had made it clear that they would support such investment with favorable leases. Among the first to propose canal excavations following Mussoo Khan's example were leaders in the Lund and Khosa tribes, both of whom faced critical internal challenges to their leadership in these years. Faced with the uncertainties of dependence on torrent cultivation (and its failure for several years running in the late 1850s and early 1860s), both responded to Minchin's initiatives by mobilizing their tribesmen in reopening old canal routes on the plains to secure agricultural income that could stabilize their positions in competition with rivals.⁷³ Investment in canal building by no means obviated the need for legitimizing claims to authority based on descent and on the mobilization of Baloch warriors, but it provided critical political leverage in underscoring chiefly authority—as both these tumandars demonstrated.

The most dramatic example of investment in canal building in the wake of Minchin's efforts, and one that suggested clearly the context provided by ongoing jockeying for tribal position, was that of Jamal Khan, tumandar of the Legharis. During the period before the British, the Leghari tribe had emerged as one of the most powerful among the Derajat Baloch tribes as the result of a series of alliances with states on the plains, particularly the Sikhs, and armed conflicts with other tribes, notably the Khosas and Gurchanis. At the time of annexation, the Leghari tumandar could command about 5,000 fighting men from five segments (four of which lived at least partly on the plains and one, the Haddianis, that lived entirely in the hills). But the situation of the Legharis also showed the importance of diverse forms of environmental adaptation—and sources of income—as critical to the assertion of chiefly position.

With his seat established at Choti, just below the hills, the Leghari chief had access both to hill torrents and canal lands on the plains as well as to grazing lands in the hills (see map 3). The Leghari tumandar controlled, in addition, lands in the Barkhan valley in the hills, which had provided a retreat for his family in the early nineteenth century when the Legharis' position on the plains had been challenged during the period of disruption and conflict following the shift in the Indus and preceding the extension of Sikh rule.⁷⁴ This position had been cemented by the establishment of marriage ties with the Khetrans, who from Barkhan played an important role in the trade of the region. Leghari control over trade through the Sakhi Sarwar pass had itself been recognized by the Sikhs through state payments. The Sikhs had also conferred on them the right to collect a tax on shops and on livestock sales at the Sakhi Sarwar fair, in return for maintaining order at the fair and acting as military guardians of the important Sakhi Sarwar Sufi shrine.⁷⁵

Nevertheless, in the years following the British annexation of the Punjab, the Leghari chiefship had come to be a subject of sharp dispute. Jamal Khan Leghari belonged to a branch of the Aliani segment of the tribe that claimed the right to the chiefship, but he was sharply challenged in the early years of British rule by leaders of other Aliani branches. The British had initially sought to mediate conflicts over leadership within the tribe (in part by appealing to the intervention of a family of Sayyids).⁷⁶ However, such conflict provided the backdrop for the attempts by Jamal Khan to shore up his position by investing in canal construction on the plains of Dera Ghazi Khan district. Access to water was key to the structure of chiefly Baloch authority—and Jamal Khan realized that nothing would serve to more effectively stabilize his power than canal lands on the plains.

Jamal Khan's most important canal investment was a scheme for the extension of the Manka canal, which showed the importance in Baloch-British relations in this period of an earlier irrigation history. Probably first excavated under the Mirranis, and reexcavated under Mahmud Gujar in the late eighteenth century, the Manka had at one time been one of the largest and most important canals in the region. It ran nearly eighty miles across the heart of Dera Ghazi Khan district. By the time of British annexation, the southern tail portion, which ran through Leghari lands south of Choti, had seriously decayed. For the British and Jamal Khan alike, the reexcavation of this part of the canal thus promised important political benefits. As Minchin saw it, the conversion into agricultural land of this strategic wasteland, "covered here and there with thick jangal," would significantly enhance frontier security. For Jamal Khan (whose notion of "jangal," or "waste," which had long played a part in the semi-pastoral economy of the Leghari tribe, was probably different from Minchin's), the agricultural transformation of the area held the key to a successful strategy for the consolidation of chiefly authority in the Leghari tribe. With much of the land on the Manka tail already claimed under prescriptive rights by the Leghari chiefs, Jamal Khan proposed widening and extending the Manka to Dajil if the government would agree to pay half the cost, recognize his chiefly rights over the land, and grant him in addition other unclaimed "wastes" to be watered by the extension. In doing so, he sought not only to tap into support from the British (who ultimately paid Rs. 29,000 toward construction, in addition to providing technical support to secure an adequate water supply to the extension),⁷⁷ but also to draw his tribesmen, many of whom practiced uncertain torrent cultivation nearby, into the canal-building process (perhaps through rights based on existing wells). By giving his tribesmen (and others) access to water in exchange for the provision of unpaid labor (or labor paid below market rates) in the canal-excavation process, Jamal Khan was able to make the project a success at minimal cost while seemingly fulfilling his role as tribal patron. In the event, Jamal Khan emerged from the Manka extension project with the government-sanctioned right to take collections in kind on all the new canal lands and with a far more secure position as Leghari tumandar.⁷⁸

The Manka extension proved critical to the consolidation of Jamal Khan's power. But it was not the only project in which he had a hand. Probably the most lucrative field for canal expansion in this period lay in the southern part of Dera Ghazi Khan, where the course of the old Dhundi—the great canal constructed by the makhdum of Sitpur in the mid-eighteenth century—could still be traced, though its lower reaches had long since silted and fallen into disuse after the great shift in the course of the Indus. The country was, according to Minchin, “in great portion a dense jungle” that sheltered robbers from the hills. In the late 1850s, proposals for reexcavating the canal had been broached to local British officials by the larger zamindars of the Rajanpur tahsil on more than one occasion, but it was only in 1861 that Jamal Khan Leghari and several other important Baloch leaders petitioned the government for permission to jointly reexcavate the Dhundi on terms similar to those that had governed the Manka extension.

In this case, Jamal Khan appears to have been less concerned with providing a role for his tribesman than with gaining access to land for commercial crop production. His major interest in the project seems to have been in gaining access to the so-called “Dhundi *pattis*,” the “wasteland” (totaling approximately 70,000 acres) at the tail of the canal that would be opened for settlement by the canal's reexcavation. The term *pattis* here referred to lands without existing wells—or well-based claims—which thus made the land available for grant directly to Jamal Khan.⁷⁹ The Leghari tumandar and his associates offered to reexcavate the Dhundi on terms similar to those given to him on the Manka. They offered to pay half the cost of the reexcavation of the Dhundi in return for government's paying the other half and giving the petitioners the right to control canal clearance and a twenty-year revenue-free lease on the wastelands to be opened at the tail. But many of the locally powerful men in Rajanpur tahsil were, for political reasons, wary of Jamal Khan's group, and they offered an alternative proposal. No doubt fearing the extension of Jamal Khan's influence into the southern part of the district, a group of local zamindars headed by one of the largest existing landowners in Rajanpur, Mir Shah Nawaz Khan Serai, submitted their own petition to undertake the Dhundi reexcavation themselves.⁸⁰ After some negotiation, the government decided to try to put together the two groups of petitioners, along with others with claims to lands along the route of the canal, and to form “a sort of joint-stock company” in order to maximize the capital available for the excavation. Sharers in this endeavor put up altogether Rs. 60,000 for the project, of which Jamal Khan Leghari contributed one-third. Three other shareholders, Imam Bakhsh Mazari (the Mazari tumandar), Mussoo Khan Nutkani, and Mir Shah Nawaz Khan Serai, each put up Rs. 5,000, with the rest of the capital provided by over twenty different shareholders, among them the Drishak tumandar. British officials thus mediated the construction of a sort of Baloch-dominated canal-building “company,” structured by British property law, that was intended to reclaim the southern Dera Ghazi

Khan frontier. The very use of the English term “company” suggests how British officials sought to ground this irrigation endeavor in a vision of political economy linking irrigation and progress, with the state providing the overarching technical support, law, and administration for an endeavor that was conceptualized as rooted in individual Baloch “private” enterprise.⁸¹

In practice, of course, the sharers in the Dhundi excavation “company” represented a wide variety of interests, many of them deeply grounded in the dynamics of Baloch tribal politics and life. For Jamal Khan and Mussoo Khan, in particular, the Dhundi excavation may well have included an element of speculation, as they sought to increase their wealth, probably through investment in commercial cropping. Other Baloch chiefs of the area saw the opening of the canal as important for providing access to irrigated agriculture for their tribesmen and thus as critical to shoring up their own tribal authority. This was probably most clearly the case for the chief of the Mazaris, who, as British officials noted, were still a predominantly pastoral tribe with relatively few agricultural resources. As Minchin observed, many Mazari practiced precarious forms of rabi season cultivation dependent on lands soaked by receding Indus flood waters and, moving with their animals to the hills during the summer. As the Indus floods were notoriously variable, they were often left without employment and free “to plot mischief.” By allowing the cultivation of commercially valuable kharif crops, including indigo and cotton, the opening of Dhundi canal lands would thus provide employment during the hot season that would help to stabilize their incomes.⁸² An important benefit in British eyes of the reexcavation of the Dhundi was thus the promise of increased power within the Mazari tribe for the Mazari chief, who would gain access to canal lands for settling his tribesmen, thus suggesting the ongoing connection between claims to tribal leadership and the provision of access to livelihoods within variable environments.

The British thus sought to balance the interests of the various investors in the “Dhundi company,” seeing themselves as providing logistical support for Baloch private “enterprise” as the project ran into technical difficulties. Not only did the British provide oversight for the excavation (even using the government’s powers in a few cases to impress labor to carry out the project), but the Irrigation Department also moved, as on the Manka, to reorient irrigation arrangements on the upper reaches of the canal to try to ensure that adequate water would reach the Dhundi pannis. When the project was hampered by large inundations from the Indus, the British paid for the construction of a new *band* on the Indus, the Shah Jamal embankment, to protect the canal and its headworks on the Indus itself. When this required further reorientations of irrigation arrangements behind the *band*, the government renegotiated with the Dhundi Company, granting it rights to take water rates from newly irrigated lands on the upper Dhundi. Indeed, Jamal Khan, acting, at least ostensibly, in the interests of the company, continued to

negotiate throughout the 1860s for increased government concessions for the project. Not surprisingly, his role in such negotiations produced suspicions among many of the other sharers in the project (and among other Baloch leaders who were potentially affected by it), and yet these ongoing negotiations suggested the importance of the project to the government.⁸³

Indeed, British technical and legal forms increasingly provided a framework for drawing Baloch energy into frontier irrigation development in the 1860s, as Baloch leaders themselves maneuvered for power within their own ecological and descent-based systems. This opened for the British new vistas of agricultural expansion on the colonial frontier. Whatever the difficulties, the initiative from Baloch chiefs produced sufficient irrigation expansion that, by the mid-1860s, it was hailed by British officials as evidence of a great colonial success. "It is roughly estimated," the commissioner of the Derajat wrote in 1865, "that the cultivated area irrigated from the [Indus] inundation canals is *three times* as large as it was at annexation."⁸⁴ Similarly, the deputy commissioner of the district extolled the political and social value of canals that now ran along the whole border of the district, except for the area in the extreme south. The advantage of canal extension, he said, had been enormous, "affording a nomad population the means of settling to fixed pursuits, reclaiming wastes; and last, but not least, making an artificial barrier against inroads from hill robbers, who are afraid to cross running water."⁸⁵ Perhaps equally important, canal projects had drawn several of the more important Baloch chiefs increasingly into the political and moral orbit of the colonial government. The continuing power of a vision of progress linked to nineteenth-century political economy was clear in Minchin's comments. "We have in the Baloch tribes of the Derajat a manly chivalrous race," he said, "and amongst their Chiefs some liberal-minded, public-spirited individuals, who thoroughly appreciate the efforts made to improve their position."⁸⁶ Nothing showed this "liberalism" more clearly, in the eyes of a man like Minchin, than Baloch investment in canal irrigation within the new framework of administration developed by the British in the district. Indeed, it suggested that, in spite of the continuing role of these chiefs as tribal leaders beyond the irrigated plains, they had—by investing in irrigation—in a sense "crossed the frontier" to take part in the new British empire.

Sandeman, Irrigation, and the "Forward Policy"

Yet the political implications of this process were nevertheless ambiguous and suggested on a broader scale the contradictions inherent in the British approach to frontier irrigation. However strong the connection between investment in settled agriculture and investment in the British regime, experience in Dera Ghazi Khan had also shown that chiefs invested in canals for a wide variety of reasons that had relatively little to do with "liberalism" or with the principles that for many British officials defined and justified their rule. However "liberal" some chiefs appeared to be in their

willingness to invest in agriculture, to step up “in the scale of civilization,” as Minchin put it,⁸⁷ the power and position of Baloch chiefs depended on the place of agriculture within a Baloch ecological system in which pastoralism, raiding, and violence continued to play critical roles. Indeed, the balance between control of agriculture and pastoral movement was, it could be argued, central to the very dynamics of descent-based Baloch ethnic identity—and, indeed, to the cultural and genealogical authority of most of the Baloch chiefs involved in canal investment.⁸⁸ It was not confinement to agriculture but the ability to tap into a wide range of productive possibilities—and employment—across both political and ecological boundaries that lay at the root of “tribal” success. As Bruce points out, there was little to suggest that Baloch were less likely to keep arms when farming than when moving with their animals; the strength of even the most “liberal-minded” Baloch chief lay in his ability to “turn out his clan of good guerilla warriors.”⁸⁹ All this suggested that, for the Baloch, plains canal investment was linked to a larger trans-border cultural and ecological framework. It also highlighted the critical importance of adaptations to the environment—and environmental change—in defining the relationship between British visions of empire and Baloch forms of social organization, community, and ethnicity.

That the cultural suppositions underlying British and Baloch interests in irrigation “development” diverged in critical ways was suggested by their differing perceptions of the relationship between “community” and “environment.” One example of this lay in their ideas about “wasteland” and “jungal.” For the British, the distinction between “waste” and productive agricultural land was fundamental, and it strongly shaped the manner in which they viewed increasing Baloch investment.⁹⁰ Though well aware of the importance of long fallows in much of this arid region, and of the existence of temporary cultivation within largely pastoral tracts, they nevertheless widely used the term *jungal* to signify land that was, in effect, morally outside the sphere of agriculture, land that could be reclaimed for productive uses only if it were cleared of *jungal* (that is, uncontrolled, scrub growth) and subjected to irrigation. *Jungal* thus represented the abode of unsettled Baloch marauders, and to become cultivation it had to be morally transformed. For the Baloch, however, investment in irrigation hardly defined a moral transformation of the land from an unsettled world of “marauding” to a world of settled agricultural production. Pastoralism and agriculture were two interrelated elements in the ecological system in which Baloch identity and organization were rooted. “*Jungal*,” in the sense that the British used it, thus encompassed for the Baloch a variety of lands, ranging from those used for pastoral grazing and periodic agriculture to those that were used for cover during raids. Indeed, many of these lands probably went through periodic cycles as they were used in different ways depending on security, pasturage, and availability of water.⁹¹ It was unlikely that, for the Baloch, investment in irrigation on the plains heralded the same moral transformation of the land that it did for Minchin.

The nature of Baloch canal investment in the 1860s thus began to raise questions for some British officials about the cultural and political meaning of irrigation and settlement and about the nature of the contrasts between British rule and the realm across the frontier that had helped to shape British perceptions of their own colonial identity. Questions were raised, for example, about the relationship of the Canal Department to the new patterns of irrigation development created by Baloch canal investment. As in Sind, the transfer of administrative control over canals to a specialized irrigation officer, linked to the provincial Canal Department, signaled a view of irrigation as a preeminently technical subject, divorced from tribal organization. The British had already appointed an officer to survey the existing canals of the Derajat frontier in the early 1850s, and in 1858 the management of these canals was brought directly under the authority of an officer of the Punjab Irrigation Department, thus incorporating it into a larger technical world. In this context, Minchin's reliance on the initiative of Baloch chiefs for the expansion of canal building appeared all the more problematic.

These questions came to a head most clearly with the arrival of Robert Sandeman as deputy commissioner of Dera Ghazi Khan in 1866. Sandeman shared many of Minchin's (and Jacob's) assumptions about the transformative nature of the British presence in the Indus basin, but he also realized that the irrigation investments of Baloch chiefs like Jamal Khan Leghari contradicted in some respects the basic logic of long-standing British thinking about the frontier and frontier policy. Jamal Khan had acquired considerable political influence as an intermediary between the British and the hill Baloch as a direct result of his increasing investment in irrigation on the plains. And yet, so long as the British conceived of the irrigated plains and the hills as separate moral and administrative worlds, his growing influence as a Baloch tribal chief served neither unequivocally to "improve" and settle the Dera Ghazi Khan plain as a cordon against the hills nor to provide the British an effective lever to control directly the Baloch across the frontier.⁹² Military force continued to be critical to frontier protection. The ambiguities in his position thus suggested the contradictions in British frontier policy.

Sandeman, for this and other reasons, came gradually to develop the foundations in Dera Ghazi Khan in the late 1860s of what later came to be known as the "forward policy," a new British approach to the frontier that ultimately had a profound impact on British policy all along the frontiers of northwestern India. The key to Sandeman's policy was the notion that intermediaries like Jamal Khan could only be controlled if the British attempted to encompass fully the system of which the Baloch were a part—a system of power that spanned the frontier.⁹³ Sandeman thus rejected the colonial taboo against crossing the frontier, except on punitive military expeditions. He sought to cast a net around the systems of Baloch political organization in the hills by drawing the Baloch chiefs and section leaders into the political orbit of the British administration, mediating their disputes in meetings

both in the hills and on the plains and offering their followers paid “tribal service” as a regular form of income. The key to the new policy lay in an expansion of British knowledge about and mediation among the tribes on both sides of the border.

Sandeman’s policy depended not just on an expansion of British knowledge and presence but also, critically, on a new frontier myth. Indeed, this new myth was perhaps most dramatically launched by a celebrated unarmed tour across the border undertaken by Sandeman himself in 1867. Formerly, British officers had been prohibited from venturing across the frontier except on armed punitive expeditions. But, after laying the foundations through consultations on the plains with Baloch chiefs and headmen, Sandeman embarked in 1867 on a tour of the headquarters of the leading Baloch tribes and clans in the hills, accompanied by leading tumandars and traveling, in the awestruck and italicized words of his Victorian biographer, “*without military protection of any kind.*”⁹⁴

The self-assertion embodied in this act defined symbolically, in effect, the new frontier power and policy of the British. The colonial state was not to be defined by a clearly bounded, physical frontier (as might be a nation-state) separating it from “outsiders,” or even by the clear moral divide between settled, productive agriculture and the wandering life of the hills (however important that notion remained for many British officials). Rather, the power of the British—and their distinctive claim to authority—was defined by their ability to encompass the Baloch tribal system within a net of British knowledge and power spread through the self-assertion of men like Sandeman—by a combination, in other words, of superior administrative science and the force of British moral character. The self-assertion of the British (embodied by Sandeman) was thus as important to the myth as was the power of British sciences of administration, and the British saw this as helping to draw even the Baloch themselves (for whom chiefly self-assertion was the key to legitimate leadership) into the spirit of their empire. As Dames noted in recording a Baloch poem in praise of Sandeman’s 1867 expedition, the event had “struck the Baloch imagination as deserving celebration in song as fully as a successful raid.”⁹⁵ The frontier was thus defined, in British eyes, not by the intrinsic differences of those without and within but by the reach of Britain’s power of assertion, understanding, and incorporation. This was not, then, a policy of ethnic subversion of the Baloch, but one of incorporation. The result was a policy pushing British agents ever more deeply into affairs beyond the Punjab and Sind frontiers.⁹⁶

Critically, however, the “forward policy” also carried implications for British thinking about the place of irrigation in the society that they ruled on the Indus plains. By extending their own authority into the hills to encompass a Baloch world that spanned the frontier, the British recognized, by implication, the legitimate intrusion of the world of the hills into the management of Baloch irrigation on the plains. Indeed, the reverse side of Sandeman’s “forward policy” of extension into the hills was the view that the management and expansion of irrigation on the

plains could not be treated as a technical subject defining a realm wholly divorced from the politics of Baloch tribal identities and politics. Neither Sandeman nor most other British officials abandoned entirely, of course, the vision of irrigation and settlement as particularly associated with transformation and moral "improvement." But the powerful vision of irrigation as a foil to the life of the hills was compromised by acceptance of a vision of Baloch ethnic identities that encompassed both investment in plains irrigation and raiding in the hills simultaneously. Closely bound up with Sandeman's move toward a "forward policy" into the hills was thus a critique of the developing British system of irrigation management on the plains of Dera Ghazi Khan.

Canal administration in Dera Ghazi Khan when Sandeman arrived was under the control of a district canal officer, D. Kirwan, who was under the authority of the Punjab Irrigation Department. Kirwan had worked closely with early deputy commissioners in brokering the arrangements that had led to the great expansion of Baloch investment in canals beginning in the early 1860s. He had provided critical technical planning that had shaped Baloch canal building in those years. Though sensitive to political issues, he had defined a system of canal administration that, at least rhetorically, put technical assessment and improvement at the heart of canal management. In Kirwan's reports, problems of managing canal heads, rationalizing the distribution of water between canals, installing regulators, and arranging for timely silt clearance to maintain proper levels represented the official business of canal management. Among the first problems Sandeman confronted on arriving in Dera Ghazi Khan was thus the question of how to reconcile the management of canals under the authority of the Canal Department with the imperatives of the "forward policy."

The management of silt clearance came to be an issue of considerable contention after Sandeman's arrival in the district, as he began to focus on the relationship between clearance arrangements and the structuring of Baloch power. The organization of canal clearance on virtually all inundation canals was critical to effective canal operation. The annual maintenance of canals depended on silt clearance during the cold weather, when the Indus floods receded. In Sind, John Jacob had outlawed all unpaid labor for silt clearance in 1856, and officials there had established a system of canal clearances based on the fixing of a water rate allowing the government to hire silt clearance labor through contractors. But as funds were for some decades inadequate to pay for labor to fully clean out the canals, contractors, who were sometimes Sindi landowners, often continued to force tenants to work on canal clearances in a manner reminiscent of a statute labor system (and frequently with the aid of local officials).⁹⁷ In Dera Ghazi Khan, too, contractors were introduced for canal silt clearance, though the system adopted was somewhat different from that in Sind. Following reforms instituted by Diwan Sawan Mal in the years just before annexation, the British had directed

in Dera Ghazi Khan that the costs of wage labor for canal clearances should be split between the irrigators, who paid a special rate, and the government, who would pay half.⁹⁸ This rate was fixed until 1857.

At that point, the Punjab chief commissioner ruled that, as the rate had proved inadequate to meet half the costs of clearances, it should fluctuate to represent a true half cost. When Sandeman arrived in the district, he found that the total cost of canal clearance had risen steadily since annexation, more than tripling in the decade between 1857 and 1867, in the process increasing greatly the financial burden of canal administration on both the government and the district's revenue payers. Although the increase was due in part to rising wage rates in the district, Sandeman blamed also the role played by prominent Baloch sardars, such as Jamal Khan Leghari, in taking up the contracts for canal clearances. The technical rhetoric of the Canal Department only masked, in Sandeman's view, the reality that Baloch politics already affected profoundly not only silt clearance but also almost all aspects of the operation of canal management—thus placing the canal officer in an anomalous position.

Indeed, Sandeman argued in 1868 that there was “a regular traffic” in canal clearance contracts and estimates being carried on in the district in the interests of powerful Baloch leaders like Jamal Khan. Contracts for canal clearance were ostensibly auctioned in public, but most were delivered (often by what Sandeman called “private bargain”) to prominent Baloch chiefs who could afford (or who could draw on credit with Hindu *banias*, or moneylenders) to pay the required securities. These chiefs then in turn assigned them to their agents, or resold them to *ods* (local contractors), often at rates that secured substantial profits to the chiefs. As the testimony of contractors themselves indicated, such profits were often further inflated by complicity between the surveyors and contractors in rigging the clearance estimates. Chiefs such as Jamal Khan thus profited in various ways. They profited directly from their ability to secure clearance contracts that had, as Sandeman saw it, increasingly been given out at inflated rates, allowing them to subcontract and make handsome profits. They profited also from the leverage that control of clearance gave them on canals on which their own lands were situated. As one *lam-bardar* put it to Sandeman, Jamal Khan was able to get the zamindars on a canal entirely in his power by clearing out as “little or much of the canal as suited him,” thus presumably securing the maximum, reliable water supply for his own lands. Indeed, the extent of Jamal Khan's influence on the Dera Ghazi Khan canals was indicated by the fact that, in 1867, he “and his friends, by his own admission,” held “the contracts of the Manka, Shoria, Dhingana, Dhoondee, and several branch canals, the amount of which came to nearly half a lakh of rupees.”⁹⁹

What particularly disturbed Sandeman, however, were the potential political problems that this system of canal administration created for his overall system of frontier control, particularly in light of the developing “forward policy.” For this he

blamed both Jamal Khan and the district canal officer, Kirwan, whose position Sandeman increasingly saw as politically untenable. Not only had Kirwan allowed the costs of canal administration to escalate, but his canal clearance policies had, inadvertently or otherwise, also influenced politics beyond the frontier. In bitter correspondence with the Punjab government, Sandeman suggested that canal administration on the plains now held the capacity to wholly disrupt frontier administration, as there was “not a single frontier chief who does not speculate extensively in the canals, and whose very position depends on the supply of water he receives.”¹⁰⁰ Careful management of water administration on the plains was thus critical to the larger political purposes of British rule on the frontier, but, by approaching such problems officially as if they revolved only around technical improvement issues, the Canal Department exacerbated the problem. As Minchin himself had written in 1864, disputes about water often caused both the district officer and the superintendent of canals great difficulty; though often appearing technical, these were generally “more political than agrarian.” Indeed, politics were often “disguised,” he wrote, “under claims for canal cuttings.”¹⁰¹ The very autonomy of a discourse of “technical” irrigation management thus seemed to undermine the effectiveness of British power.

A case in point were the disputes surrounding the irrigation of the Mazari tribe. Though still in the late 1860s a relatively poor and still largely pastoral tribe occupying the southern part of Dera Ghazi Khan, the Mazaris and their chief, Imam Bakhsh, were increasingly prominent in Sandeman’s plans for controlling the Dera Ghazi Khan frontier, particularly the frontier facing the Marri-Bugti hills. Sandeman saw Imam Bakhsh as a critical intermediary in dealing with the Bugti chiefs, with whom the Mazaris had close relations. The Mazari often grazed their cattle in the Bugti hills, and the Bugtis in dry seasons brought their cattle down toward the river into Mazari lands. To cement his own influence with the Bugtis, Imam Bakhsh had negotiated with the British in the early 1860s on the Bugtis’ behalf for lands on the canal projects in which the Mazaris were involved, including the Dhundi and the resuscitation of the Gamul, a branch of the Kadra canal.¹⁰² Like attempts to settle sections of the Bugti in Sind, however, these attempts to create Bugti settlements on the plains in Dera Ghazi Khan proved unsuccessful.¹⁰³ But the potential role of the Mazari chief as an intermediary in British relations with the Bugti nevertheless remained vital to Sandeman’s frontier strategy. He thus proposed in 1867 the reworking of the Gamul project (which had not been an initial success) to shore up the position of the Mazari chief, developing with the canal engineer a technical plan to solve long-standing water problems in the Rajanpur tahsil (exacerbated by ongoing problems with the supply of the Dhundi canal as well). Sandeman proposed a new “joint stock” scheme involving not only the reopening and extension of the Gamul but also the construction of a new head and a protective Indus *band* for the Kootub canal, which would be tailed into the Gamul

to give it a secure supply. This would not only allow the increasing settlement of some Mazari tribesmen (who continued to be the most heavily dependent of the Baloch tribes on the plains on cattle and pasturage) but would also draw labor and cultivators onto irrigated lands controlled by the Mazari chief, including former tenants (presumably Jats) from Bahawalpur, thus increasing and stabilizing Imam Bakhsh's income. The result would be enhanced power within his tribe and enhanced leverage for the British in dealing with the Mazaris—and, by extension, increased leverage for Sandeman in dealing with the Bugtis.¹⁰⁴ Technical improvements in irrigation works were thus critical to Sandeman's political vision for a system of control on the Mazari frontier.

However, the political benefits of such technical improvements could in practice be undercut, in Sandeman's view, by the very reliance in these projects on the technical expertise of the district canal engineer. Neither design nor operation problems were free of broader implications relating to the tribal politics of the Baloch. In the case of the Mazaris, the increasing influence of the district canal officer in Mazari affairs had come with a clear political cost. In early 1869, even as new canal projects in Rajanpur were under way, Sandeman discovered that the executive engineer had sold contracts for clearing existing canals in Rajanpur to a relative of Jamal Khan, in spite of the delicate problems facing Sandeman in composing relations between the Legharis and the Mazaris, who had interests in these canals. Strains had been exacerbated by previous conflicts between Imam Bakhsh Mazari and Jamal Khan Leghari over canal investments in Rajanpur, not all of which had turned out successfully.¹⁰⁵ Kirwan, of course, defended his actions as necessary to maintaining good canal operation. Since no Mazaris had come forward when the contracts were auctioned, he declared, he had given the contracts to a man who could do the job. But Sandeman complained that this hardly answered the political objections, for, whatever the difficulties in letting the contracts, such actions greatly complicated his political dealings with the tribes, a position with which the Punjab lieutenant-governor ultimately agreed.¹⁰⁶

Even more serious, however, were the political conflicts over water distribution that developed as Baloch and British canal investment advanced, not only in Rajanpur but in other parts of the district as well. A representative example of this was the dispute between the Legharis and the Khosas that centered on Jamal Khan's extension of the Manka canal. In reorienting the upper branches of the Manka to ensure the delivery of adequate water to Jamal Khan's extension at the tail, Kirwan had effectively severed the Dhori, which watered Khosa lands, from the Manka, installing masonry heads on the Manka to do this. For Kirwan, this was justified by the fact that the Dhori now was connected to the new Fazalwah, built by Fazal Khan Lund, which supplied water to the Khosas as an alternative. But, in the eyes of Sandeman, this played into the bitter feuds that had long disrupted politics within the Khosa tribe, and it fanned long-standing enmities

between a section of the Khosas and their “hereditary blood-enemies,” the Legharis. The shift in the source of water for the Dhori fed into a battle for power within the Khosa tribe between Sikander Khan Khosa, who was related by marriage to the Lund tumandar, and Ghulam Haider Khan Khosa, the son of the Khosa chief, who was not. To Ghulam Haider Khan, locked in a bitter dispute with Sikander Khan for influence within the Khosa tribe, the severing of the Dhori’s ties to the Manka, particularly at the behest of the chief of the Legharis, and its connection to the Fazalwah, seemed deliberately calculated to undercut his ability to control tribal access to water and, with this, his ability to claim legitimate chiefly authority in the tribe. Seeing the loss of his control over Dhori water, Ghulam Haider Khan protested strongly to the British, and failing to gain redress, he carried his protest outside the tribe, “wander(ing) about complaining of his grievances.” Ghulam Haider Khan accused Sikander Khan, the Lund tumandar, and Jamal Khan of being allied in a conspiracy against him, a conspiracy that was being aided by the executive engineer. Although the Khosas were among the largest landowners in the district, and long tied to agricultural lands on the plains, the episode, in Sandeman’s estimation, seriously disrupted their relations with the British government.¹⁰⁷

The potential significance of such conflicts for frontier security was demonstrated to Sandeman by the emergence of a violent challenge to British authority on the frontier in the mid-1860s. Shortly after Sandeman’s arrival, the frontier witnessed the rise of an “outlaw band” in the hills led by Ghulam Husain Bugti. Ghulam Husain had challenged the authority of the Bugti chief, and, gathering around him tribesmen of the Marris, Bugtis, and Khetrans, numbering at times as many as 1,200 men, had launched a series of raids along the border, raiding as far as Kelat and Jacobabad in Sind. The chief problem in bringing Ghulam Husain under control lay in the fact that the chiefs of the various tribes in the hills were able to exert little control over him. Perhaps most critical to Ghulam Husain’s success was the asylum and support he received in disposing in the hills of the property and livestock plundered in raids onto the plains. Ghulam Husain was given asylum by the Haddiani Legharis and Khetrans, and much of the property he plundered was sold to the Khetrans at Barkhan, who, in the words of Sandeman, “sent it for sale into our territory with their annual kaflahs (caravans),” which passed through Sakhi Sarwar with the safe conduct of Jamal Khan Leghari.¹⁰⁸ Sandeman was convinced that Jamal Khan knew well of Ghulam Husain’s movements but, “for purposes of his own,” concealed them from the district authorities.¹⁰⁹ Indeed, his wealth and leverage with other chiefs in canal affairs had given him power, as Sandeman saw it, to defy the district authorities. “Sandeman used to say,” wrote his protégé, Richard Bruce, “that when [Jamal Khan] came for interviews he used to sit with his tongue in his cheek looking superbly insolent.” His power on the frontier galled Sandeman. “Pat, my boy,” Sandeman supposedly told Bruce, “until we can smash

up Jamal Khan and his little game we shall never do any good either in the district or with the Border tribes.”¹¹⁰

Asserting his “forward policy” in the late 1860s, Sandeman thus sought, in dealing with Ghulam Husain, to build a new alliance of tumandars along the border. Using the Mazari tumandar, Imam Bakhsh, as an intermediary, he established direct relations with the Bugti chief, Ghulam Murtaza Khan, even though the Bugti tuman lay entirely beyond the ostensible (British-defined) Dera Ghazi Khan frontier. After holding court in a *darbar* at Jampur with all the Bugti headmen, Sandeman turned this alliance against Ghulam Husain. When warned by the Bugti tumandar that Ghulam Husain was planning a large raid into Rajanpur tahsil, Sandeman mobilized the forces of several of the Baloch tumandars, including the Gurchanis and Tibbi Lund, who in January 1867 killed Ghulam Husain and almost three hundred of his men at Hurrund in one of the most dramatic frontier encounters of the early British era.

The result was a sensation. This “brilliant affair,” the Punjab government subsequently wrote, ending as it did “in the dispersion of an organized and extensive robber confederacy,” heralded a new era in frontier policy in Dera Ghazi Khan. The Hurrund raid marked a critical turning point in the history of the Dera Ghazi Khan frontier, for the door for the ascendancy of the “forward policy” was now opened. Shortly afterward, Sandeman sealed his reputation as the new star of British frontier policy with his celebrated unarmed stroll through the hills.¹¹¹

But, as Sandeman wrote stormily to the government in the aftermath, one of the chief lessons of the Hurrund raid was the inescapable interconnection between frontier control and administration on the plains, particularly the control of water. Access to irrigation was key to structures of Baloch power, and central to Sandeman’s view of the proceedings was that Jamal Khan’s influence on both sides of the frontier had been so strengthened in the period before the Hurrund raid by his role in the district’s canal system—in which virtually all the frontier chiefs were involved—that it had undercut his role as an intermediary for the administration on the frontier and unsettled the frontier in general.

In the period following the Hurrund raid, Sandeman thus moved aggressively to try to exert more political control over canal administration in the district, even as he pushed his “forward policy” into the hills. He did this not just with an attack on the position of Jamal Khan but with an assault as well on the reputation of the Canal Department’s executive engineer. The pervasive—and inevitable—intrusion of politics into a department that operated ostensibly on the basis of technical knowledge had in practice, Sandeman now argued, produced only a system of deeply entrenched corruption, in which the engineer, Kirwan, was fully enmeshed. Indeed, by 1870 Sandeman had succeeded in putting Kirwan into the dock at the chief court of the Punjab in Lahore for accepting bribes, charging him with being in league with Jamal Khan in a massive scheme of canal corruption. According to

the charges, Kirwan had from the early 1860s acted in concert with Jamal Khan and leading Hindu bankers of Dera Ghazi Khan to siphon off canal allocations and to channel canal contracts to Jamal Khan at concessional rates in return for the transfer of large sums to Kirwan's bank accounts. It was the result of this corrupt bargain that had resonated all along the frontier in the run-up to the Hurrund raid. "I believe the largest raid that ever occurred on this border, in which 300 men were killed and wounded," Sandeman now wrote in high outrage, "was instigated to a great extent by those concerned in these canal fraud cases."¹¹²

Among numerous charges, the major ones centered on Kirwan's handling of expenditures and contracts for the clearance and extension of the Dhundi and Manka canals. Sandeman charged that a sum of Rs. 16,000, authorized by the government for the Dhundi project, had been endorsed by Kirwan not directly to the *tahsildar* (sub-district administrator) overseeing the work but to a "Dhoondee Canal Account" with Chimmun Lall & Loodu Ram, leading bankers of Dera Ghazi Khan—an account that was controlled by Jamal Khan Leghari. From this account, Rs. 6,000 were subsequently transferred to the tahsildar for actual Dhundi canal expenses. But the remaining Rs. 10,000 were transferred to another account of Jamal Khan's, entitled "Cotton Deposit Account." Augmented by an additional Rs. 10,000 of Jamal Khan's own money, this account was then used by Loodu Ram to engage in cotton speculations, a venture in which Jamal Khan and Loodu Ram were sharers in profit and loss. When these speculations proved successful, Jamal Khan transferred from his profits the following year a sum of Rs. 4,000 to the personal banker of Kirwan, who drew up *hundis* (bills of credit) to transfer the amount to Kirwan's bank accounts in Agra and Lahore. The evidence thus suggested that Kirwan and Jamal Khan had been in complicity from the beginning.¹¹³

Equally disturbing were the alleged arrangements worked out between Kirwan and Jamal Khan for the disposal of the Manka silt clearance contracts. From Kirwan's first coming to the district, the prosecutors charged, he had encouraged corrupt arrangements for silt clearance contracts. Though instructed to sell the clearance of the Manka by public auction, Kirwan, "according to an understanding between himself and two native contractors, Jamal Khan, chief of the Lugaries, and Ahmed Khan, his agent, gave them year after year a monopoly of the contract on the most favorable terms, stipulating that he, Mr. Kirwan, should receive a share of the profits."¹¹⁴ Right up until 1869, Kirwan had continued to receive kickbacks while Jamal Khan retained control of the clearances. Most importantly, as Sandeman saw it, Kirwan's corruption explained more clearly than any earlier evidence the dramatic escalation in the cost of canal clearances in Dera Ghazi Khan since the time of annexation. The revelations of 1870 thus only confirmed what Sandeman had long suspected. The corruption of the executive engineer had encouraged corruption, as he saw it, at all levels of the district canal administration.

EMPIRE, IRRIGATION, AND TRIBAL IDENTITY

The lessons of this scandal, however, were far larger. Kirwan himself was acquitted of most of the charges against him at Lahore, a result, as the prosecutors saw it, of the supposed perjury of key witnesses among the Hindu bankers. Nevertheless, the charges against Kirwan and Jamal Khan resulted in critical changes in the framework for irrigation in Dera Ghazi Khan. In immediate terms, Kirwan's official career was brought to an end. The British also reprimanded Jamal Khan officially for his involvement, and they stripped him of his position as an honorary magistrate. But more significant were the larger changes that came in the scandal's wake. The revelations regarding Kirwan and Jamal Khan provided the occasion for reinterpreting the meaning of frontier irrigation in ways more fully reflective of the redefinitions of the frontier—and of the meaning of water control and British rule—implicit in Sandeman's "forward policy."

The subsequent administrative triumph of the "forward policy" on the frontier was marked by the ascendancy of Sandeman and his ideas in dealing with the Baloch from the mid-1870s into the 1880s. Sandeman moved on from Dera Ghazi Khan to become eventually the agent to the governor-general for Baluchistan, a position from which he directed a policy seeking to incorporate the whole regional Baloch political structure, including the influence of the khan of Kelat, into a British colonial framework.¹¹⁵ But the impact of irrigation on the Indus plains was equally telling. If the Lahore trial had made clear that the principles of effective irrigation were separate and distinct from the potentially "corrupting" intrusion of tribal politics into canal administration, the results had also made clear that irrigation was central to the structuring of Baloch tribal systems themselves and had to provide a central element in the ways the British sought to encompass structures of tribal community into new structures of modern imperial administration.

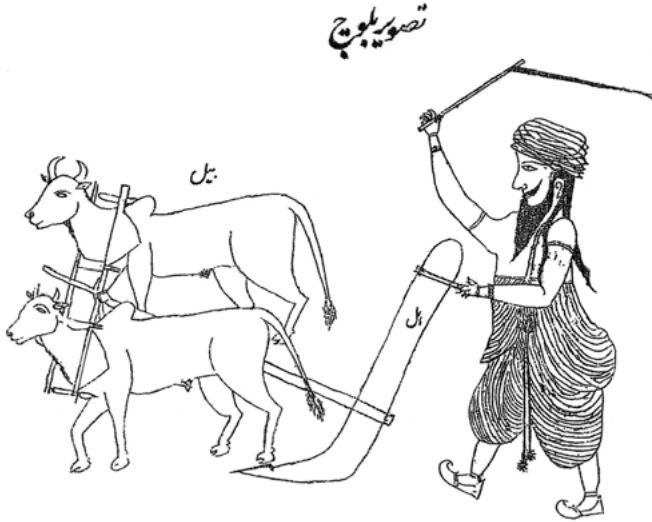
One measure of this was the now almost categorical rejection by many of Sandeman's supporters of the idea of separating sections of the Baloch from the hills and from their tribal cohorts in the interest of frontier control or moral transformation. "With regard to the independent Biluch tribes on this border," Bruce wrote, "nothing but evil would ensue from trying to settle particular sections or individuals, or indeed, from dealing with them in any other way independently of the main body." To the contrary, the authority of Baloch chiefs needed to be upheld in order to stop tribal feuding and to encourage ongoing Baloch settlement on their own tribal lands, "which are finer than any we could offer them." Bruce argued, in effect, that settlement could occur (and, in fact, was occurring) within the existing frameworks of Baloch structures of tribal adaptation to their environments. The Bugtis, Marris, and Khetrans, he noted, had been steadily grazing their cattle and extending cultivation on lands that, except for short periods, had previous to British rule long been waste—a response now, he implied, to increasing frontier order.¹¹⁶ Critical for the expansion of agriculture was thus the strengthen-

ing, within this context, of Baloch tribal authority and the position of the Baloch chiefs, not the breaking up of tribes. An imperial framework was needed within which the connection between Baloch ethnicity and settlement on the land could be maintained—not the subversion of Baloch tribal identity to effect a moral transformation. Indeed, the encapsulation of tribal community was increasingly viewed as central to stable political order.

Critically, this process also involved a new British emphasis on the importance (and legitimacy) of Baloch cultural identity within the operation of politics and irrigation on the Indus plains. In sharp contrast with the preexisting concern to morally transform Baloch leaders by drawing them across the border, some British officials now seemed to suggest that Jamal Khan Leghari's fault was not that he had brought Baloch politics into district canal administration but that he had compromised Baloch identity as he had done so—that is, his dealings with Kirwan had become corrupt precisely because he had strayed too far in his canal machinations on the plains from being truly “Baloch.” T. H. Thornton, Sandeman's biographer and himself a high British official, thus noted that Sandeman's reliance on Imam Bakhsh Mazari in the late 1860s as a political counter to Jamal Khan had reflected not only that Imam Bakhsh was strategically situated on the Bugti frontier, loyal to the British, and “singularly upright” but that he was also “a Baluch to the backbone.”¹¹⁷ This was, by implication, in sharp contrast to the image of Jamal Khan embodied in the tales of complex finance emerging from the Chief Court in Lahore. Ironically, this reflected, of course, a continuing British stereotype, shared by many Baloch themselves, that pastoralism, in which the Mazaris were heavily involved, was connected to true “Balochness.” Noteworthy also was that being “Baluch to the backbone” was viewed now as offering no challenge to full participation in the colonial political structure and in the expansion of irrigation on the plains; to the contrary, it was seen by some as a vital element in the stabilizing process of agricultural expansion (see figure).

Jamal Khan Leghari's subsequent career itself illustrated the importance of these attitudes. In spite of being censured and denied magisterial powers after the revelations of Kirwan's trial, Jamal Khan retained an important position in British frontier policy in the 1870s precisely because he remained one of the most important players both in Dera Ghazi Khan irrigation and in Baloch affairs. It was no surprise in this context that Sandeman himself ultimately played the critical role in rehabilitating Jamal Khan by using him as an intermediary in his political dealings with the Khetrans in the early 1870s, and finally by employing him in 1875–76 on his mission to Kelat, a service for which Jamal Khan was rewarded not only by the restoration of his magisterial powers but also by the honorary title “nawab,” a strong signal of his continuing political importance to the British.¹¹⁸

By the time of his death, Jamal Khan had thus regained his reputation as one of the most heroic of the late nineteenth-century Baloch tribal chiefs. This was illustrated by an elegy in Balochi written in response to a contest sponsored by an



“Picture of a Baloch.” (From Chand, *Tawarikh-i Zilla Dera Ghazi Khan*, 541.)

assembly of Baloch chiefs to commemorate Jamal Khan’s death at Dera Ghazi Khan in 1881.¹¹⁹ Jamal Khan’s position of influence with the British was now recognized as one of the foundations of his reputation: he was as splendid a presence when he “sat with the English on a chair of state” as “when he drew his sword and made war on his foes,” the poet wrote. But his chiefly image was derived equally from his ability to mitigate the uncertainties of the diverse environments in which his tribesmen lived, an ability that hinged on his control over water. Water, of course, came ultimately from God. “May Allah protector of thousands bring the pleasant rains,” the poet exhorted, “may they come in their season and rain upon Choti’s mountain-skirts [near the seat of the Legharis], may the river [Indus] rise in flood and the creepers burst into flower.” But the successful appropriation of this bounty depended on the construction and management of the torrents and inundation canals necessary to take advantage of these gifts (see map 3 for Choti).¹²⁰ Nothing symbolized more clearly Jamal Khan’s ability to tap into God’s bounty than his largesse to followers and fellow tribesmen: “Of all chiefs of tribes the Choti Nawab is the first with sharpened knife in hand . . . to kill the fatted kine, sheep and goats, that nothing should be lacking in hospitality. . . . Hand-mills and bullock-mills perpetually grind corn, and processions of trays with golden covers pass in; and minstrels in numbers overflowed the place, bringing deputations into the assembly-hall in Jamal Khan’s dwelling.” This was the cultural currency of Baloch power. “Many thousands of enemies and friends,” the poet wrote, “abase

themselves.” Although images of pastoralism and animal keeping continued to be prominent, the successful collection and munificent distribution of the produce of irrigated agriculture were clearly critical to Jamal Khan’s reputation.

Jamal Khan’s position made clear the degree to which, even for the British, tribal power and irrigated agriculture had come to be intimately related. On one level, of course, the spread of agriculture, and agricultural development, remained central to British visions of morally civilized life and of their own transformative power in India. Contrasts between hill marauding and agricultural civilization continued to mark a good deal of British rhetoric. But, on another level, the definition of imperial power, particularly in the Indus basin, was increasingly linked not only to a rationalized structure of irrigation administration but also to an emerging British vision of themselves as patrons of a tribal social order—defined by genealogical community. To manage such a tribal order, even within the context of agricultural settlement, was central to imperial authority.

But central also to emerging colonial statecraft was the notion that the principles of political economy and genealogical community were distinct and separate (and rooted in very different relationships to nature). This was, for Sandeman, a critical lesson of the Kirwan affair. “The great cause of all,” Sandeman wrote, “was on account of the power over the water having been transferred from the people and their agents to the canal officials.”¹²¹ The key for Sandeman was thus to develop an administrative structure that could balance potentially conflicting interests (while recognizing their distinctive imperatives), and he now insisted, with canals under Irrigation Department management, that the deputy commissioner be allowed to review any technical Irrigation Department decisions in canal operation that might have implications for tribal politics. Accepting his recommendations, the Punjab lieutenant-governor directed in 1874 that, though “the officers of the Canal Department” would have “primary” responsibility for the technical administration of canals, their decisions would be subject to review and oversight by the deputy commissioner of Dera Ghazi Khan.¹²² Overarching personal and imperial authority—which could encompass the dynamics of *both* technical and tribal authority, in spite of their contradictory principles—was now conceived, in other words, as critical to imperial control.

Such conflicting forms of organization were also confronted within the more institutionalized arrangements that arose with the completion of the first regular settlement of Dera Ghazi Khan in the 1870s. The problem of a stable water supply free from political manipulation had come to be seen as central to the government’s revenue, particularly with an increasingly diverse non-Baloch population now settling on the Dera Ghazi Khan plains.¹²³ In the wake of the settlement, the government thus moved—in negotiation with the Baloch chiefs—to purchase most of the “private” Baloch canals built in the 1860s and to bring their management under direct Irrigation Department control. This included the Massuwah, the Fazalwah, the Dhori, the Manka tail, and the Dhundi, among others. The aim

for the British was to establish “a well-ordered, economical” system of “professional management,” as one official put it, not only to ensure a “fair distribution” and counter the “demoralizing effects” of uncertain water supply among the populace but also to establish the unquestioned position of the colonial state as the technical arbiter of the productive order.¹²⁴ Although the calculations of many Baloch chiefs may have been slightly different, they too had long had interests in commercial production and were attuned to the advantages of direct British water management, particularly in the face of the extremely high and often unpredictable maintenance costs associated with repairing and rebuilding canal heads on the ever-shifting Indus. Moreover, earlier canal-building initiatives had already proved successful for many Baloch chiefs in securing what was a major aim: the rights to large estates—and stable income—under the terms of the land settlement. Even as canals were managed by departmental officials, the interests of Baloch “tribal” leaders were thus in some ways now embodied in new forms of landed property, encapsulated within technically managed structures of water delivery.

Yet tribal relationships to water within this new order remained highly ambiguous. No one imagined, of course, that political interest in water control would disappear as canals were brought under direct departmental management. Indeed, one way the British tried to control this was by preparing registers of existing irrigation “customs” as a way of recognizing existing water rights even within the framework of government management (an undertaking whose checkered results will be discussed in chapter 4). But, perhaps more importantly, the encapsulation of Baloch “tribal” community within the framework of the new property regime remained itself an issue of considerable tension within the context of multiple and variable forms of production marking the region’s environment. The complexity of this was suggested by the demarcation of the new estate of Jamal Khan Leghari himself during the first regular settlement. Jamal Khan’s was in fact the largest of all the Baloch estates to emerge in the wake of the district land settlement of the 1870s. The best available figures for the estate’s lands come from later files of the Court of Wards, which took over the estate of Jamal Khan’s grandson (also named Jamal Khan) in the 1920s. By then, the total area of the estate was approximately 114,000 acres, of both irrigated and unirrigated land, the great bulk located in Dera Ghazi Khan and Jampur tahsils. At the heart of the estate was more than 10,000 acres of canal-irrigated land. This was the key to the estate’s value, for it provided Jamal Khan with income to sustain his position as a tribal chief.

At the same time, the linking of income to fixed property rights seemed to undercut some of the other dynamics of local tribal leadership, for it shielded Jamal Khan from the need to activate tribal bonds across diverse and uncertain productive environments.¹²⁵ Rarely, after the 1860s and 1870s, for example, did Jamal Khan need to mobilize Baloch warriors to defend and protect the shifting environmental bases of their livelihoods—a fact reflected by the far more frequent,

subsequent recourse of Jamal Khan's descendants to the British courts, rather than to raiding, in order to protect their lands.¹²⁶ With state-recognized property rights the key to its income, the family also looked subsequently to the British to maintain the stability of the estate during succession crises, as, for example, during the long minority of Jamal Khan's grandson, and again in the 1920s, when the Court of Wards reassumed control of the estate. Records from the Court of Wards' administration suggested the tensions this engendered. With the Aitchison College-educated tumandar in the 1920s spending more time on politics in Lahore than running the estate, the deputy commissioner recorded complaints from his Baloch tenants "that he did not entertain his tribe properly" but now spent the estate's money "on himself;" a telling charge in a world where largesse was central to chiefly legitimacy. For his own part, Jamal Khan complained that it was the Court of Wards' administration itself that had isolated him from his tenants, undercutting his tenants' direct personal dealings with "their chief."¹²⁷

But in spite of such pressures, these developments were also mitigated—and forms of tribal connection underscored—by the extremely heterogeneous character of the productive Dera Ghazi Khan environment and the nature of estates within it. In Jamal Khan's case, settled canal-irrigated land made up less than 10 percent of the total recorded land in the estate, in spite of its centrality in the generation of income. The rest was designated either as "uncultivated" or under other forms of grazing and production.¹²⁸ An important chunk was recorded as irrigated by rodkohi, whose ongoing uncertainty as a form of irrigation was suggested by the wildly variable annual statistics on torrent-based production collected at the second regular Dera Ghazi Khan settlement in the 1890s.¹²⁹ The extreme uncertainty—and lack of spatial fixity—of torrent-based agriculture was suggested by Fryer's discovery at the first settlement that he could not even conduct a census of plows in Dera Ghazi Khan tahsil, where the bulk of Jamal Khan's estate was located, because they were shifted so frequently from one area to another, depending on the availability of water, that they were impossible to count.¹³⁰ The fixing of estate boundaries thus hardly translated into fixed production—or, indeed, settlement. Even within the boundaries of the estate, Jamal Khan thus continued to manage a structure of many uncertain and varied forms of production, where access to livelihoods continued to be intimately intertwined with genealogical ideologies and relationships. Similar considerations drove the ways the settlement dealt with the old Baloch tribal tumans. The rough demarcation of these tumans had predated British rule, in the process providing a framework for state recognition of and negotiation with Baloch tribal leaders. But here, too, the British now sought to clarify tuman boundaries while officially converting them within the framework of the British revenue structure into chiefly *inams*, which gave chiefs the right to collect revenue directly from their tribesmen. The largest of these inams were fixed in 1873 for the Leghari and Mazari tumandars. But the British specifically required the chiefs to collect these inams in kind

(a practice known as *jagir batai* and a departure from normal British revenue practice), with the explicit aim, as one official put it, of strengthening “the patriarchal or tribal system of administration in the Baloch tumans.” “The authority of the *tumandar*,” this official wrote, “depends partly on his hospitality, and partly, like all authority, on his power to make himself unpleasant when the authority is questioned.”¹³¹

Such efforts to fix Baloch property rights as well as to facilitate the exercise of tribal leadership reflected the broader aims of British policy as they sought to establish imperial authority. Central to these efforts was the management of control over water. The Baloch had long negotiated with neighboring states as they responded to opportunities for both trade and commercial production—well before the arrival of the British. But the process was now intimately bound up both with the environmental and economic constraints shaping Baloch life and with the distinctive forms—and ideological tensions—marking the new project of British imperial state making in the Indus basin region. Nowhere were these tensions clearer than in the emerging structure of the colonial property regime, whose roots are best explored in the heartland of expanding agriculture in the Indus basin region, the central Punjab.

Community on the Waste

The Village and the Colonial Property Order

The government has embarked with all the energies it can command in the noble work of improving the condition of the people and developing the resources of the country. It has made a commencement from which it is impossible to draw back, without damage to the national character and without the sacrifice both of income and power.

—JAMES THOMASON, GOVERNOR OF THE NORTHWESTERN PROVINCES, 1851¹

Native society will, I believe, be the happier, so long as it can still be held together by bonds of consanguinity. The severance of these bonds merely promotes a conflict of interest amongst men who would once have considered themselves akin.

—C. L. TUPPER, PUNJAB CUSTOMARY LAW, 1881²

No less than on the trans-Indus frontier, canal building and water control played an important role in the establishment of British imperial rule in central Punjab. “What the soldier begins the irrigation engineer continues,” wrote Alfred Deakin in describing the beginnings of imperial irrigation in the region.³ Even as the British moved into the Punjab, engineers such as Sir Proby Cautley, who launched the construction of the Ganges canal in the 1840s, had already demonstrated the potential efficacy of large-scale canal building in northern India. The first major government canal project undertaken after the British annexation of the Punjab in 1849 was planned with explicitly political motives in mind. The Bari Doab canal, though proposed initially as an expansion and improvement of Shah Jahan’s old Hasli canal, was subsequently pushed forward by the British largely for reasons of pacification after the military conquests that secured Punjab for the British after the defeat of the Sikhs. “After annexation,” as a later Irrigation Department report put it, “the work was pressed on, because the immediate construction of the canal was regarded as almost a matter of political necessity to provide

employment for the disbanded Sikh soldiers, who, having their homes in the centre of the [Manjha] tract, would otherwise have had little encouragement to turn to agriculture.” Divided into four main branches running along “the crests of the dividing ridges” of the Bari *doab* (interfluvial plain, in this case between the Ravi and the Beas/Sutlej rivers), the canal came ultimately to irrigate “all the upper part of the Doab . . . in Gurdaspur, Amritsar and Lahore Districts”⁴ (see map 4). It was, as Deakin put it, “the first great work undertaken” by the British in the Punjab.

Indeed, early irrigation policy in central Punjab reflected some of the same political imperatives that had marked irrigation policy along the Baloch frontier. But if the need to use irrigation to settle and control potentially dangerous populations continued to shape British calculations (even in the central Punjab, which was itself a “frontier” in the early years of British rule), the history of irrigation in the Punjab revealed a more comprehensive turn to property law as the key to establishing control over the environment. Issues of property were at the center of the great nineteenth-century debates in Britain about social order. Property ownership was, for many, at the heart of a vision of the legal (male) individual as the quintessential liberal subject—and of society as defined on the stable foundations of property interest, issues taking on new meaning in Britain in this period as a property-based electoral franchise was gradually extended. But property also provided a frame within which indigenous, “natural” forms of Punjabi community, based in particular on “tribe” and genealogy, were increasingly encompassed within a larger, rationalized—and spatialized—structure of Indus basin order. Property law in Punjab provided the critical framework within which the colonial state brought together competing visions of community whose juxtaposition defined a main current of late nineteenth-century thinking: one defined by man’s productive action upon nature, the other by nature’s action upon man.

Property’s relationship to stable government was, of course, hardly new as a theoretical issue in India; debates on the relationship of property to political theory and popular consent dated back centuries in the United Kingdom and had significantly influenced debates on the nature of British rule in India at least since the permanent settlement of the late eighteenth century.⁵ But nowhere was the interaction between social theory and visions of stable governance in India more evident than in the Punjab in the second half of the nineteenth century, where land settlements drew significantly on British social theorizing.⁶ The preoccupations of this theorizing were the same ones that we have already seen operating on the Dera Ghazi Khan frontier: to delineate the relationship between the settled producer as the pivotal figure of contemporary political economy while appealing to “community” as the countervailing key to social order. Unlike in Dera Ghazi Khan, however, the key institution shaping the British property regime in the central Punjab was the “village,” an institution with far older roots there than in the

more heavily pastoral trans-Indus region, and one that reflected a long history of largely well-based agricultural settlement in a semi-arid environment.

British concern with the “village” as a central institution of Indian rural society had, of course, an important history long before the British arrival in Punjab. As many historians have argued, the “village” carried a range of meanings in nineteenth- and twentieth-century debates on Indian society.⁷ Early Punjab administrators in both eastern and central Punjab, for example, were powerfully influenced by the prominence given to villages in the structure of British revenue administration in the Northwestern Provinces, farther to the east, in the era immediately before the annexation of Punjab. But the history of the “village” in the Punjab, as the base of the region’s property regime, also reflected the particular environmental realities of the Indus basin region. Indeed, the “village” became the central vehicle through which the British adapted to this environment a nineteenth-century vision of a state administration—and of legitimate, modern state authority—that was rooted in the attachment to the land of both the individual property-owning producer and the genealogical community as the twin foundations for modern Indus basin governance.

PROPERTY, INDIVIDUAL, AND COMMUNITY

To understand the role of the village in the Indus basin property order, it is important to step back in order to emphasize the centrality of property law more generally as the conceptual marker of a modern state defined by “reason.” The delineation of an order of property was undertaken in colonial India not simply to structure the collection of revenue, or to stabilize society (however important these were), but to define the autonomous authority of the colonial state as a self-imagined agent of reason. Though hardly new, this vision of the state was reformulated in the wake of 1857, the era in which the new Indus basin property order was first effectively forged. The importance of property to the relegitimation of the state in the second half of the nineteenth century is suggested clearly in B. H. Baden-Powell’s late nineteenth-century effort to sum up the structure of British land law. Land systems in the provinces of British India were, as Baden-Powell made clear, extremely diverse, reflecting not only India’s wide regional variations but also the piecemeal ways in which the East India Company had, amid changing intellectual currents and financial pressures, annexed territory over time. But the common history of these land systems could now be found in the “reasoned” efforts of the British state to systematize this diversity. As Baden-Powell noted, British administrators in the eighteenth and early nineteenth centuries had long argued about the underlying nature of the property relations that they encountered in India. From the perspective of the late nineteenth century, however, the history of this debate was first and foremost about property law as a frame for establishing the autonomous

authority of the state as the voice of reason. As Baden-Powell noted, pre-British states had traditionally asserted an absolute claim to state land ownership. But, as he now argued, the British claimed to be the successor to this right only in so far as this was necessary for them to reformulate the colonial property system in accord with modern principles. As Baden-Powell explained, in reviewing earlier British pronouncements on landed property rights: "I think, on the whole, what was meant by the various declarations in the Regulations and elsewhere, was this; that the Government claimed to succeed to the *de facto* position of the preceding ruler, only so far as to use the position (not to its full logical extent but) as a *locus standi*, for re-distributing, conferring, and recognizing rights on a new basis."⁸ The point was to establish an autonomous position from which the colonial state could construct a legitimate property order in India in accord with its own claims to rationalizing authority.

It was from this position that the state constructed a regime of property in the Indus basin that sought to balance the position of the productive, settled, individual revenue payer and the indigenous "tribal" community as the twin foundations of a distinctively colonial political order—and it was here that the "village" became the chief container for British action. To signal the primacy of the village within the Punjab's property system, the British designated the village as the basic unit of revenue responsibility. But within this framework, the system was one that carefully recorded individual property interest and the rights of each revenue payer as the bedrock of the system. As J. M. Douie thus noted in the *Punjab Settlement Manual*, "village" responsibility occupied "a far more prominent position in our codes than in our practice."⁹ In practice, each landowner signed a *patta* (or agreement) at settlement signaling his acceptance of the revenue demand, which in turn represented, in practical effect, a state recognition of his property rights. Property rights were thus based on an implicit contract between the colonial state and the revenue payer, a contract that offered state-recognition of "proprietary rights" in return for acceptance of the revenue demand. The contractual foundation of proprietary rights constituted the property owner (and taxpayer) as a rational actor, subject to the laws of political economy. In this sense, the village was less important as a social collectivity than as the key site of settlement, the place where, even in the midst of a still significantly pastoralist world, the individual operated as an active agent to transform the land. "Originating in labour, industry and enterprise," Sir Richard Temple wrote in the 1880s, property rights provided a powerful bond binding the state to the people:

The people, regarding this property as the most precious of their material possessions . . . have clung to it with unsurpassing pertinacity. It has been recognised and confirmed finally in all the regions that come under British sway. The legal recognition has been supported, too, with a registration of titles officially and judicially framed, and amended from year to year. This registration, in reference to its vast extent and its accuracy up to date, is the finest that has ever been framed anywhere.¹⁰

Here individual property as a type of contract provided the basic foundation for modern rule.

Yet the importance of the “village” lay equally in the fact that it served, at the very same time, as a vessel for indigenous “community,” within which the individual property owner was conceived as deeply embedded. Whatever the importance attached to the individual producer—and to the “public” role of the state as a patron of his production—the British recognized from the beginning that local claims on the land were often layered and embedded in systems in which individuals were rarely holders, as Baden-Powell put it, of the entire “‘bundle of rights’ (which in the aggregate make up an absolute or complete estate).”¹¹ Complex tenure arrangements were rooted in the historical evolution of villages in their relationships to the state and to the land. But, most importantly, such arrangements were also rooted in the bonds of “tribe” and genealogy, which, as the definers of the most powerful form of indigenous community, were seen as providing a critical stabilizing counterpoint to individual rights. Just as essential as the delineation of property boundaries, therefore, was the recording of the genealogical connections among the “village proprietors.” This became a vital part of every settlement record in the Punjab, defining the collective identity of the village landowners as a group. Such genealogies were often used in Punjab settlements to trace the village proprietors to a single ancestor or group of ancestors who had originally occupied the land and founded the village. “Village by village,” Clive Dewey writes, “the Settlement Officers and their assistants traced the descent of rights and the descent of right-holders back to some mythical founder.”¹² Stories of the original breaking up and settling of the land were often central to the grounding of such communities on the land. But the *essence* of this form of community lay not in the physical process of attachment to the land (that is, in the “labour, industry and enterprise” that generated individual property rights) but rather in the recorded genealogical tables themselves determined by the independent power of “blood.” “A glance at them will tell the history of a village,” wrote one settlement officer.¹³ The “village community,” in this sense, was rooted not in production but in a world of “blood” whose bonds lay outside the world of contract.

The key to the Punjab’s property order thus lay in the colonial state’s ability to bring these two conceptually distinct (indeed, even conceptually antithetical) visions of the Punjab “peasant” together: to define him, in other words, simultaneously as a property-owning subject (defined by action upon nature) and as a “communal” man (defined by the action of nature, through “blood,” upon him). And it was the delineation of the “village” as a frame for both these visions that defined the Punjab’s property-making process. This was, of course, an example of what James Scott has called “state simplification,” the mechanism by which the state pulled local variation into an objectifying framework to make manifest the principles of state administration.¹⁴ With its manifold connections between settled agriculture and

pastoralism, the Punjab was a region of significant variability in rural settlements—and thus in forms of “villages”—shaped significantly by, among other things, the availability of water. In much of central Punjab, the dominant village settlement pattern was one defined by lineage segments hiving off old village sites as the population grew (and political conditions allowed) and sinking new Persian wheels on sometimes marginal lands to found new, village settlements.¹⁵ But if this was the dominant pattern, it was hardly universal, and in areas of lower rainfall—and deeper water tables—new wells defined different patterns of settlement through proximity to grazing lands. In such places, wells were often opened by more miscellaneous groups of men and defined “village” settlements marked by groups of scattered hamlets, often with grazing land mixed in between. Earlier political vicissitudes also shaped varying village settlement patterns, but it was in relationship to the environment that variation was most marked.

The key to colonial policy in such conditions was to give all Punjab villages a common *form*, whatever their internal, local variations. And this was provided by the process of colonial *mapping*. This gave the very term “village” its distinctive meaning and significance within the framing of the state-structured property system, for in this context the term “village” itself, in its official usage, became synonymous with a mapped space known technically in British administrative parlance as a *mauza*, or village estate.¹⁶ The historical connections between such cadastral mapping and centralizing state power had, of course, already been well established by the time the British annexed the Punjab in the mid-nineteenth century, both in India and elsewhere. As Roger Kain and Elizabeth Baigent write, “the mapped cadastral survey was one of the most powerful instruments” for colonial governments to establish “their different political ideals by allocating land, their prime resource.”¹⁷ But the key to cadastral mapping in the Indus basin lay not just in facilitating the *allocation* of land (however important that came to be, as we shall see) but also in defining the “village” itself as an objectified spatial frame that allowed the British to encompass variation within the common framework constituting a distinctive colonial statecraft. It was thus an “objectified,” mapped vision of the village that served as the vessel for grounding both the individual property owner and the community within a single space.

This process of grounding both the individual producer and the community on the land of the *mauza* was often a complex and conflicted one, as suggested by Richard Saumarez Smith’s close analysis of one of the earliest British settlements in central Punjab, in Ludhiana district in the 1850s. As Smith illustrates, issues of productivity and community were, at the time of the British arrival, often closely linked in central Punjab villages (just as they were on the Baloch frontier). In villages in Ludhiana, Smith found that “shares” in village assets were calculated originally in terms of “ploughs,” thus reflecting a system organized by “the business of agricultural production, with shares based on the productive capabilities of

individual members.” It was in relation to the village as a productive unit that ties of genealogical connection were activated. But British policy in the Punjab, as Smith convincingly shows, tended to shift the language of local community and of “shares” in village assets from one linked to productive participation in the village to one operating in the realm of genealogical calculation and “blood,” as if these were fundamentally distinct realms. Increasingly, shares in the village came to bear little relationship to production; rather, they marked the bonds of genealogy separating the “owners,” constituting the “village community,” from tenants who, however important to production, were excluded by genealogy from the “proprietary body.”¹⁸ As Smith has written, “To represent a village’s history in the form of a genealogy of its proprietors does lend a certain slant to social relations,”¹⁹ and, indeed, this suggested a village class structure defined less by production than by blood. It suggested the rooting of community in a realm conceptualized as entirely separate from and anterior to the productive action that defined the individual as revenue-payer.

This too, of course, was a form of “state simplification,” which remained in tension with the complex realities of (and variations in) local “village” organization. Structures of shares in the community recorded by the British were hardly defined everywhere by genealogy and ancestral claims.²⁰ In many cases, the “discovery” of ancestral communities as frames for landowning often reflected negotiations at settlement among officials and local village powerholders as much as it did the simple recording of preexisting rights and genealogical relationships.²¹ But from the perspective of the state, an overarching framework of reason was the key to the framing of a property order that encompassed the individual landholding producer and the local “village community” alike in a common, objectified, “village” system, defined by the encapsulation of varied and sometimes conflicting relations within the mapped and bounded mauza.

The intersection of social theorizing with the environmental realities of an arid region was thus critical to the delineation of the Punjab property system as it first emerged in the third quarter of the nineteenth century. We have already seen similar pressures at work on the Dera Ghazi Khan frontier, but in central Punjab the “village” property system offered a far more systematic framework for the encapsulation of both individual production and local “tribal” forms of authority and community within a fixed set of territorial structures. This was of course made possible by a long history dating back to the Mughal period and earlier of Persian wheel-based “village” settlement in this region. But it was a system shaped also by the distinctive imperatives of a semi-arid environment and by the marked environmental variations across the region. The structure of property thus assimilated a wide array of social forms to the mauza as a mapped colonial structure. The tension between this variation and the mauza as a spatialized ideal type only increased as this property order was extended across the increasingly arid reaches of western and southern Punjab in the ensuing decades. But what gave the

system real traction in the Punjab was its grounding in both an overarching structure of law and a structure of environmental categories, with respect to which the dualities of colonial state-making, focused on a conjuring of the villager as simultaneously a productive individual and, contrarily, as a communal man, found expression. In their own ways, structures of law and of environment thus provided the foundations for the entrenchment of the Punjab “village” property order in ways that were to have significant long-term political consequences for the development of the entire Indus basin.

Community and Customary Law

The distinctions defining the colonial property order in central Punjab would have been impossible without increasing British reliance in this era on the larger ordering power of law as central to the state’s claims to legitimacy. Just as property itself was, for the British, rooted in law (and was indeed, for some, the *heart* of law), the development of a field of legal analysis and rule making called “customary law” provided powerful legal and conceptual underpinnings for the structure of community that was in process of construction by the British as the key to stable state authority. Indeed, the development of law shows most clearly how the colonial framing of property and “natural community” were powerfully linked to ongoing European debates on social theory.

The emergence of a vision of law that captured the separation of production and kinship in the construction of the Punjab village owed much to the thinking of Sir Henry Maine, the legal member on the Viceroy’s Council from 1862 to 1869, who had popularized the notion that the movement from primitive to modern society was fundamentally a move from “status” to “contract.” Maine’s ideas were, of course, shaped in large part by intellectual conflicts in Europe. But his ideas, which later led toward Ferdinand Tönnies’s theoretically critical distinction between two differing forms of modern community—*gemeinschaft* (natural community) and *gesellschaft* (contractual community of autonomous persons)—readily supported transformations in British thinking in India about the fundamental nature of local community there and its relationship to production.²² Maine clearly saw the “village community” in evolutionary terms, with the emergence of individual property and voluntary interest replacing status and kinship as progress occurred.²³ In such a view, the British state could only truly ground itself in India as a *modern* state through links to the individual property owner and revenue producer, thus defining itself as an agent of “moral and material” advance. But the village in India also survived, in Maine’s view, as a status-based community, a powerful relic, as it were, of an earlier evolutionary era. The key role of the law was therefore not to substitute community for private property but to underwrite the genealogical, “natural community” as a counterweight to the potentially disintegrative effects of the maximizing, market-based behavior that the laws of political economy associated with

individual private property rights. As C. L. Tupper, a student of Maine and important theorizer of “customary law,” put it: “[N]ative society will, I believe, be the happier, so long as it can still be held together by bonds of consanguinity. The severance of these bonds merely promotes a conflict of interest amongst men who would once have considered themselves akin.”²⁴ This was the danger that the recognition of individual property rights raised. The aim of “customary law” was thus, as Justice William Rattigan later put it, to shore up a society defined by the unchosen bonds of “natural community,” even in the face of the disintegrating effects of the “rights of property based on individualistic theories. . . . Although we may not be able to stop altogether this current of individualistic thought from slowly undermining the foundation on which village property is based, it is within our power to retard and weaken this destructive process.”²⁵ It was a system intended, in other words, to allow “natural community” and individual property rights to coexist, even as they were rooted in opposing and countervailing ideas.

The development of “customary law” reflected these theoretical concerns. The emergence of “customary law” was rooted in the long-standing practice of recording local customs as part of the process of British settlements. In every village of the Punjab, settlement officers had included in the village “administration papers” (*wajib-ul-arz*) a record of rights, which delineated village “customs.” Such customs included matters of inheritance along with relations both to the environment and to histories of state power. But recorded customs in settlement records of rights were quite varied and their nature often superficial.²⁶ It was only with the passage of the Punjab Laws Act of 1872 that “custom” came to be the foundation of a *system* of “customary law” in British Punjab, covering a wide range of village relationships. In the wake of this, the British moved to regularize the collection of custom through the separate recording of what were called *rivaj-i-am* for each district, or compendiums of “custom” that were based on detailed questionnaires.²⁷ Such questionnaires, like the records of rights, dealt in principle not just with questions of status and kinship but with all aspects of local village life, running the gamut from inheritance to issues closely connected to production, such as access to water or labor, rights of tenancy, access to grazing land, or management of irrigation channels. Although Tupper’s guidelines for these questionnaires focused on matters of family and clan, they also included a section dealing with matters of “production,” including tenancy, irrigation, pasturage, “agricultural machinery,” and manuring. But, as in the case of British settlement practices, the strong tendency of British policy in the development of customary law—and British theorizing—was increasingly to marginalize the importance of “customs” relating to production, and to cast customary law as a law of kinship, a counterweight to the law of contracts operating in such areas as debts, mortgages, and tenancy. In legal terms, matters relating to production, such as conditions of tenancy, were thus increasingly taken out of the realm of customary law, as Smith argues, and legally regulated by statute.²⁸ Customary law thus evolved

under British auspices as a system of law intended to capture and give form to what Tupper termed “the *interior* organisation of the village,” a realm conceived as independent of production and rooted instead in “ideas of a tribal character; the ideas, I mean, of common descent and operative blood relationship.”²⁹ It was through customary law, in other words, that the British attempted, as Smith suggests, to move the legal constitution of the village—as a community—in exactly the opposite direction from Maine’s famous dictum on the evolution from “status” to “contract.”³⁰ Whatever the reality of the severalty of property, the village as *community* was imagined as existing independently of the operation of “contract,” defined instead by the interiority of kin-based “status,” or blood.

In operation, of course, the relation between property and customary law was quite complex. Even in the processes of collecting customs, the British found that the “customs” reported on settlement questionnaires could hardly escape from the pressures of property interests and often reflected the position of the more powerful in the village, particularly the larger landowners.³¹ However much customary, genealogical community was conceptualized—following Maine’s dictums—as anterior to property and to contract-based community, the actual operation of customary law depended in Punjab on the existence of a village world in which individual property rights, sometimes unequally distributed, were a central fact. Even within the framework of customary law, as Charles Roe and H. A. B. Rattigan put it, “Disputes requiring decision can only arise, after individual property right has come into existence.”³²

Within this framework, however, British theorists found that the central, underlying principle that made the “interior,” genealogical logic of community *visible* within the external world of property relations was a relatively simple touchstone, the denial of landed inheritance and property rights to women. This lay at the very heart of Tupper’s theorizing. In a world where marriage patterns facilitated the movement of women out of the patrilineage, and yet where individual, private property was recognized by the state, the legal denial of inheritance to women was essential, Tupper argued, for the integrity of the patrilineage—and the essence of genealogical community—to be maintained.³³ Whatever the actual variation in forms of customary practices that the British encountered as they collected “custom” in Punjab, Tupper hypothesized the denial of landed female inheritance rights to be the underlying principle that gave coherence to customary law as a legal system. The significance of this denial transcended whatever may have actually existed as “customary” practice. Linked to a logic of “blood” that was theoretically anterior to rights in property, control over women thus came to symbolically define the genealogical community as a stabilizing political counterweight to the severalty of property rights and interests as recorded in British settlements.³⁴

The impact of this dual system of customary law and of contract law on the operation of Punjabi villages is, of course, not easy to determine. The language of

genealogical community, linked to patriarchal authority, was a language with deep roots in the Punjab long before the arrival of the British, but it had taken many forms. We have already seen in the previous chapter the important role of genealogical calculation in defining distinctive forms of “tribal” (and Sufi) authority, adapted in many cases to distinctive environmental conditions. In some parts of the Punjab, particularly among Jats to the east, kinship divisions had long been linked to clan (or *khap*) panchayats, which regulated both kinship and local affairs.³⁵ But the British system, in conceptually separating the individual property owner as *producer* from the *villager* defined within a “natural” ancestral community (as different aspects of the same person), pushed the evolution of such bodies in a new direction. The new vision of community was composed of men who, of necessity, operated simultaneously in both these registers: as bearers of individual, state-delineated “rights,” and as men whose honor and status were shaped by their place in a world of “blood” relationships. In legal terms, these capacities, though combined in the same persons, were held conceptually apart. They thus produced a distinctive type of community in which the competitive individual property owner could act as an aggrandizer, an active productive agent, and a champion of inequality, even as the language of honor and kinship defined a frame of common “community” identity and status, to whose stabilizing social pressures he remained theoretically subject.

The key term that captured this form of community was *biradari*. Although the term ultimately gained considerable importance in twentieth-century Punjab politics, it is a difficult one to pin down, as it has historically referred, like many Punjabi words for communities rooted in kinship, to different things in different circumstances. It was not a new term. In its most basic meaning, as Hamza Alavi has noted, it simply signified a descent group, including, in principle, “all those between whom actual links of common descent can be traced in the paternal line, regardless of the number of generations that have elapsed.”³⁶ It was thus, in theory, a natural community, defined by the logic of blood and activated through patterns of local, unequal gift exchanges.³⁷ In practice, however, it was a form of community transformed in the second half of the nineteenth century by the conceptual structure of the colonial property regime. In its evocation of common patrilineal kinship, it subsumed an important egalitarian element, at times expressed in local panchayat organization and in other informal forms of solidarity among the village “proprietors.” But it also provided a language of local legitimation for the inequalities in local resource control that were a product of the property regime, operating at multiple scales, both below and above the level of the village. Although *biradari* solidarity among lineage males was cast in the language of honor and status, associated in particular with the control of women, *biradari* also provided a frame for competition and faction building among unequal property holders—a competition significantly mediated by the law and the British courts.³⁸ *Biradari*

was a frame that seemingly embodied—and revealed—the tension between a vision of “natural community” rooted in a logic of “interior” genealogical connection, located outside the economic frame of production, and the reality of a village world increasingly defined by competing individual and family productive interests that defined the structure of the colonial system.

COMMUNITY ON THE WASTE: COMMONS, ARIDITY, PASTORALISM

Tracing the meaning of such a form of community is difficult because the term *biradari* rarely appears directly in British records.³⁹ But its relationship to the evolution of local ideas is perhaps better understood if we look more closely at how British ideas of community—embodied in the law and in land settlements—came to be linked more concretely to British ideas about the structure of the environment itself. British ideas shaping Punjab’s revenue “settlements” were closely tied to British ideas about the nature of physical settlement on the land as well.⁴⁰ To understand the entrenchment of this vision of community in nineteenth-century Punjab, it is critical also to recognize how the British built their property system in Punjab on a vision of the environment that made a fundamental distinction between productive land and what the British called “waste.” This distinction, too, was a “state simplification,” but it was one that had far-reaching consequences in grounding a particular view of “community” on a particular colonial vision of the Indus basin environment.

The delineation of clear conceptual boundaries between “wasteland” and productive property was one with old roots in colonial thinking (indeed, in British history itself), but it came to shape the distinctive meanings of the village as both a productive place and a vessel for genealogical community, in two ways. The first had to do with the ways that the British mapped “villages” as distinctively *productive* spaces set apart from the arid areas of pastoral wandering that surrounded them. In many (perhaps most) parts of central Punjab, of course, villages abutted one onto another, and the drawing of external village boundaries focused on drawing the borders between them. But, in other parts of the Punjab, including parts of central Punjab, rural settlements were surrounded by large quantities of uncultivated land, and drawing the external boundaries of villages in such circumstances involved differentiating “village” lands from the “wastelands” outside them. Since villages were sites composed primarily of individual property, they were, by definition, sites of revenue assessments that required productive land to be at their heart. As the “village” became the key site of settled, private production, lands outside the village, “wastelands” that by environmental definition could not be assessed for individual revenue, were marked out logically as a different form of property. Wastelands outside the village were generally designated as state-controlled *rakhs*. Though car-

rying the potential promise of future state-initiated transformation, such lands were by definition held, as Baden-Powell put it, in the general or “public” interest, as state property.⁴¹ This was a distinction, of course, that was ultimately to have critical significance for state-sponsored irrigation projects.

But the structured opposition between “waste” and private property had critical implications for the categorization of land in a second way, as well—for it also shaped the categorization of land *within* the village. Villages were essentially defined as sites of productivity, but large chunks of “wasteland” were also normally included within village boundaries, though for purposes quite different from those shaping the external boundaries of villages. Within the boundaries of mauzas, “wastelands” (still configured in environmental opposition to productive land) came to serve the very different function of grounding the “village community” as a genealogical entity on village land, for they were demarcated as community (or common) property. When contained within the village, “wasteland” (in opposition to the severally held lands of the village proprietors) came to be preeminently associated with the community of proprietors, not in their capacity as productive individual revenue payers but as a “natural community” defined outside the realm of production. Wasteland within the village was what came to be known as the “village commons,” or *shamilat deh*.

The Commons and Village Community

The history of the “commons” as an institution is, of course, a complex one, and the general literature about the operation of common lands is now large. Writing on the “commons” as an institution has exploded since the publication of Garret Hardin’s delineation of the “tragedy of the commons” in the 1960s, but much of this has been concerned, as Hardin was, with common property as a problem in individual incentives and rational choice.⁴² Hardin’s ideas have come in for attack from many directions; scholars have emphasized the variations in local common property regimes in different contexts and the importance of close study of differing strategies of maximization and adaptation, of local culture, of ecology, and of state institutions for analyzing such regimes. But most analyses of common property regimes—even critiques of Hardin—have nevertheless continued to focus on the relationship between property regimes and structures of resource “use.”⁴³ Although this relationship was no doubt important to the history of the village “commons” in the Punjab as well, the significance of the “commons” for the Punjab’s property system lay far less in “use” than in the role of the commons within the larger structure of ideas shaping the relationship between “production” and “community,” which was central to the overall structure and ideology of the colonial property order.

In part, the demarcation of the “commons” dramatized the operation of reason as constitutive of the colonial property system. The delineation of individual property

and the delineation of the “village commons” were, as a logical proposition, inseparably linked. This was evident in the way the “commons” was normally demarcated as part of the land settlement process.⁴⁴ The first aim of settlement officers was to sort out the claims of villagers to land held in individual “proprietary right.” This meant determining which land was potentially productive, because productive land had to be linked for revenue purposes to a specific revenue payer. But, once individual property rights (and revenue obligations) were determined, the British then dealt with “waste,” and it was this that was normally recorded as “commons,” essentially the land left over.⁴⁵ Critically, commons was thus determined not by any history of common *use* at all but simply by its definition as “wasteland”—that is, land on which the claims to productive use necessary for revenue assessment (and thus for individual proprietorship) could not be, or had not been, readily made. Cases where individual proprietors had laid claims to “culturable waste” but paid revenue only on cultivated land were thus viewed in early settlement reports as “anomalies” that had to be specially explained and dealt with.⁴⁶

Of course, the extent of the “commons” as the joint property of the village “proprietary body” also depended on the external demarcation of the mauza. The reasons why certain areas of “waste” were included in villages rather than demarcated as separate state rakhs was often left unexplained. Sometimes the drawing of boundaries between village “wastes” and state rakhs became a matter of some official controversy. As Baden-Powell noted, in some areas, such as Muzaffargarh district, virtually all of the district’s “wastes” were initially included in mauza boundaries only to be subsequently removed and reconstituted as government rakhs in the face of official objections. In Kangra, the question about whether forest lands were to be constituted as village *shamilat* or as government land was debated for decades.⁴⁷ Sometimes this was guided by whether the state had potential water projects (or other commercial interests, as in some forest tracts) in mind on the waste. But, more commonly, officials allocated land simply by reference to a fixed formula. “Where the waste was of small extent,” Baden-Powell wrote, “the whole of the adjoining area was included in the village-boundary as a matter of course; where it was extensive, each village received twice, and, in some cases, thrice, the cultivated area.”⁴⁸ The remainder was constituted as state property. The critical requirement was simply that a line be drawn so that not only different forms of property but also different forms of authority and community could be represented on the land.

This is not to say, of course, that in practice different forms of “waste” were not often related to different forms of settled production—or pastoralism—in varying contexts. For the British and for Punjabis alike, the cultural meanings attached to the oppositions between cultivated and uncultivated land were undoubtedly complex.⁴⁹ Uncultivated land in the Punjab varied from *banjar jadid* (“new waste,” or short fallows) that might have been cultivated relatively recently, to *jangal*, which

signified barren scrub land, not subject to cultivated control, to *ghair mumkin* (meaning, in revenue parlance, “without possibility” of cultivation), which included roads and the village site. In much of western and southern Punjab, large chunks of shamilat were carved from *bar* land, though in much of central Punjab, village shamilat was constituted primarily from land referred to as *banjar qadim* (“old waste,” or long fallows). The term “long fallows,” of course, suggested an opposition between village shamilat and cultivated, proprietary land that was far less sharp than that suggested by the term “wasteland.” Such land was often vitally important to village production, used not only for grazing of plough and well animals but also, in some cases, transformable to banjar jadid under pressure of increasing population growth or in the event of greater availability of water. This was particularly the case in those large areas of arid western Punjab where periodically opened and abandoned wells were common—and, indeed, the presence of such wells sometimes arose as an issue in drawing village boundaries.

In practice, of course, the delineation of the village “commons” was rarely totally straightforward, for the actual “uses” of these lands were impossible to ignore entirely, not least because uses of the waste were often an important adjunct to agricultural household production. Most British officials knew full well that “wasteland” was not always without important uses; it was they, after all, who in their revenue records sometimes explicated the nuances of indigenous terminology for “wastes.” In reality, as Minoti Chakravarty-Kaul has demonstrated, the relationship between commons and structures of village production was extremely varied in nineteenth-century Punjab. Although the notion of shamilat deh was a British creation (in the sense that it was legally employed) dependent on village mapping, the concept of “common land” could hardly be so described. When it came to grazing, village usage often extended well beyond demarcated village shamilat and included nearby rakhs as well. Villagers sometimes grazed their cattle on shamilat and on state rakhs alike, whereas pastoralists at times folded their flocks onto village land. The management of commons was also closely integrated into other forms of productive community management. Private plots were often scattered in eastern and central Punjabi villages to equalize access to varying qualities of land, including the village commons. “Collective management” of the commons, which was normally kept in relatively compact blocks, often went hand in hand in such villages with the collective village management of other productive resources, such as “field channels of irrigation wells and ponds.” Income from common lands, whether from grazing fees from outsiders or from rents charged to *kamins* (village servants), sometimes supported collective village management expenses.⁵⁰ To suggest that British attempts to legally situate the shamilat on the “waste,” defined as a form of “commons” that had no relationship to production or to collective village organization, would thus seriously distort the realities of village life.

But the British were, in general, little interested in the administration of this collective realm, which was quite ancillary to their emerging legal vision of the village. Many officials undoubtedly recognized that the commons was in some instances an important productive adjunct to household organization (particularly for agriculture depending on animal-powered wells), and “rights” of access to the commons were often recorded in the *wajib-ul-arz*. These also became an issue of some importance in litigation in the British courts. But the structure of law, as officials themselves noted, offered little to support the collective *management* of the commons.⁵¹ That the commons was far more important to the British as a symbolic field for the inscription of community defined by ancestral shares was suggested by the fact that, in many villages, areas of “waste” were defined as “commons” not only for the village as a whole but also for the many constitutive genealogical segments of villages (called *pattis* or *tarafs*), as well.⁵² Customary law, which was constructed largely in the language of “rights” and “shares” and was predicated on genealogical community, offered few legal remedies whereby the village community as a whole could take productive control of the commons and administer it for joint benefit. With increasing pressure to bring the commons into the realm of production, almost the only legal remedy that British law had to offer was partition of the commons into individual proprietary holdings.⁵³

Whatever the issues surrounding private rights and collective use, the village “commons” thus gained its greatest significance in late nineteenth-century Punjab as part of a property regime ordered by efforts to attach “productivity” and “community” to distinctive, binary environments. At the same time, the colonial delineation of the “commons” suggested the deep tensions in British efforts to ground “natural community” on the “waste,” even as individual property was grounded on productive village land. On the commons, the logic of order embodied in the British revenue system and the logic of cooperative relationships—long common in the Indus basin environment—seemed to collide. Indeed, the distinctive history of the commons in the Punjab suggests the deep tensions marking the sharp theoretical separation between “natural community” (*gemeinschaft*), defined by nature’s actions upon man, and “voluntary community” (*gesellschaft*), defined by calculated productive action upon nature, that had emerged as such a powerful force in British thinking.

Whatever the tensions, British usage of the English term “waste” was a “state simplification” driven less by the needs of practical administration than by the logic of the binary distinction between proprietary land and “wasteland” that was central to the emerging property order. By classifying land as “waste,” the British marked it, in effect, as outside the realm of production—that is, of individual economic calculation and therefore, by definition, outside the realm of individual property. In so doing, they made the land available for other purposes: either to define the direct authority of the state on the land (as a potential agent of transformation), or to

signal the powerful existence of the genealogically determined “village community.” Environmentally speaking, community was moored on the “waste,” a realm set apart from that of capitalist competition and production.⁵⁴

Water, Aridity, and Village Community

All of this provided a critical backdrop for the history of water control and irrigation development in the Punjab. Just as was the case in the trans-Indus region, many officials looked to water projects as the key to “developing the resources of the country,” as James Thomason had put it in 1851. In this context, water was the great antidote to “waste.” Yet British responses to “waste” were far more complex, because “waste,” defined by high aridity, was not simply a category of lack but also one of the key ordering foundations for a property system within which the British sought to balance individual production with stabilizing structures of “natural community.” The tension between “waste” as a marker of community, on the one hand, and as a marker of a productive lack that had to be overcome through the patronage of productive forces, on the other, runs through the Indus basin’s subsequent history.

This balance between such opposing visions of waste was, in fact, central to the British definition of the mapped and bounded “village community” as the centerpiece of the colonial property order. As an arena of production, the village was, in a sense, the carrier of the “civilizing” values that the British associated with agriculture. But as mapped and bounded space, the village could also be a frame for spatializing, categorizing, and linking waste and community in distinctive ways, as the British found when they extended the colonial property order into western and southern Punjab. Environmental pressures rooted in the scarcity and variability of water in an arid region played a critical role in this process. Equally important, the complex relationship between agriculture and pastoralism in this region shaped significantly the ongoing extension of the property order in western Punjab. Ironically, even as many British officials viewed pastoralism as the polar antithesis of the settled, civilized productivity associated with the village, its forms of genealogical community, preeminently associated by the British with “wastes,” also came to be seen by some as a model for the vision of “natural community” shaping the new British vision of genealogical community as a stabilizing community framework for the settled property order.

We can trace these tensions by tracking the conflicted attempts by the British to assimilate western Punjab into the model of “village community” adapted from central Punjab. If nothing else, levels of rainfall dictated that villages in western and southern Punjab could never be quite the same as those in central Punjab. This was in spite of the fact that *all* villages in Punjab, subject to British revenue settlements, came to share a common mapped form, the mauza, which was extended across western Punjab in the second half of the nineteenth century. But in areas of extreme aridity, where water was scarce and variable, the mapping of the

commons (and of village estates) took on significantly different contours than it had in central or eastern Punjab. Cadastral maps, of course, provided the British a framework for inscribing individual property, common property, and state property onto the land, regardless of environmental conditions. On official paper, mapped territorial villages looked very much the same whether in Ludhiana or Bhakkar. But the larger sizes of some villages, with village “commons” that sometimes dwarfed private holdings of agricultural land, and the large territories of state rakhls often abutting these villages, betrayed on settlement maps the environmental differences between those of dense productive settlement and those with large arid tracts.

Indeed, as the British moved from central Punjab into the more arid reaches of the Indus basin, the difficulties in mapping out villages that could contain the British property structure ran through the correspondence of British settlement officers. In the early years, settlement officers from the arid districts of western Punjab repeatedly reported to Lahore that “village communities” hardly existed in these regions, even as provincial policy makers responded initially that they could “hardly credit” such reports and that the establishment of such communities was central to British policy.⁵⁵ Rural settlements having many of the features of “village communities” did exist in or near the rivers of much of southwestern Punjab, where more stable long-term settlement was possible. But, as the settlement officer of Multan put it: “Away from the rivers the villages are generally merely a collection of wells which have been sunk in the neighbourhood of a canal or in the more favorable spots in the high lands. In these there has never been any community of interest, in very many cases there is not even a common village site; each settler had obtained his grant direct from the State, sunk his well, and erected his homestead on it.”⁵⁶ Environmental exigencies had seemingly produced historical patterns of settlement far different from those of central Punjab. Rather than “powerful clans settling in one location, and then spreading on all sides as their numbers increased,” as one official put it, the pattern of settlement in the most arid zones was of strangers “of different families and races” investing periodically in single wells.⁵⁷ In such circumstances, the act of attaching blocks of “common” to settled “villages” had very uncertain meanings. Although the British demarcated village estates in conformity with their general policy and assigned the uncultivated “waste” lying amid such wells as “common lands,” or *shamilat deh*, this could have little relationship to genealogical relationships among a “village proprietary body” that made no claims to common ancestors. “Here,” as James Douie wrote in the *Punjab Settlement Manual*, “the common waste,” in its normal sense, “could not exist,” for there were no true “village communities.”⁵⁸ Yet, in spite of this, the concept of the “village” retained a powerful hold on the structuring of the revenue administration, which was constructed here too on the mapped delineation of mauzas.

At base, the problems of adapting such areas to the central Punjab pattern were rooted in the environmental demands of well irrigation in areas of low and highly variable rainfall. Though requiring significant capital for investment, wells were often, in such regions, speculative undertakings. Wells proved most long-lived in the vicinities of inundation canals, where they provided critical supplements to canal irrigation. But in many areas they were risky investments. Describing well cultivation in the Thal desert, for example, one settlement officer suggested how variations in rainfall, however minimal, could be critical to the sustainability of well cultivation. When rains were inadequate, the withering of surrounding grasslands could easily strike a fatal blow to well-irrigated cultivation by depriving well bullocks of fodder. The death or breakdown of bullocks was often the key to the abandonment of land, for wells were unsustainable if limited well water had to be supplied to grow fodder in addition to food crops.⁵⁹ Many wells were thus periodically (and sometimes semi-permanently) abandoned, in spite of the theoretical claims to proprietary right that they established. As the settlement officer of Jhang noted in 1882, not only did tenants abandon lands, but, in many cases, “even the owners show but little attachment to their properties” when better opportunities for cultivation could be found elsewhere.⁶⁰ Such patterns were further underscored by the close connections in many parts of the region between agriculture and pastoralism. Proprietors who were also cattle owners abandoned wells readily when forced by the season to move with their cattle to more distant pastures.⁶¹

Of course, when conditions were right, as James B. Lyall, one of the most acute British thinkers on property, observed, such wells could also be reopened and “proprietary rights” reasserted, thus suggesting the deep-seated character of the indigenous association of wells with property rights. As Lyall noted, “the sinking of the well, clearing of the waste, making of the water-course or embankment” gave the landowner “a strong title, which survived for a long time even if the land fell out of cultivation.”⁶² But this only produced a pattern of abandoned and reopened well sites in much of the region—a pattern little suited to the drawing of the firm boundary between productive cultivated land and uncultivated “waste” that was necessary to the demarcation of the “commons” and of the village community.

The impact of these environmental conditions was evident in British discussions of the policies of earlier states and their roles in facilitating such forms. Governments, of course, had long had an interest in the extension of cultivation and had structured their revenue systems to encourage the investment of capital in Persian wheels on uncultivated lands. Earlier rulers, such as the nawabs of Bahawalpur, had given revenue concessions in perpetuity to those willing to invest capital in “the extension of cultivation” by sinking wells on new lands.⁶³ But, as the British noted, they had made little effort to embed such property within village communities. This was most clearly evident in the policies of Diwan Sawan Mal, the governor of Multan for the Sikhs in the period immediately before the arrival

of the British. In encouraging agricultural expansion, Sawan Mal had given large quantities of wastelands to men of capital, including both his political supporters and men of commercial castes, in return for investments in Persian wheels (sometimes in association with labor or capital contributions to inundation canal investments as well).⁶⁴ Recognizing the former domination of particular tracts by pastoral chiefs (or, in some cases, by other formerly powerful service or religious families), he had allowed such men to take small collections as “superior proprietors” (*ala maliks*) when they had encouraged the sinking of wells on formerly uncultivated lands. But Sawan Mal’s policies had conferred virtually all rights relating to production on men with capital, known generally as *chakdars*, the constructors of wells, who, in the words of the Multan settlement officer, held their land “in full proprietary right, subject only to the payment of a quit rent” to the superior proprietor.⁶⁵ The effect had thus been to encourage the establishment of individual proprietors as the primary controllers of the land based on investment in the land’s productivity, with little reference to genealogical community. At the same time, Sawan Mal had done little to demarcate village boundaries; whether he even recognized the notion of the village “commons” at all was a subject of some debate among British officers.

The British evaluated these policies through the lens of their own administrative dichotomies. On the one hand, Sawan Mal had done more, as some saw it, to “develop” the country than any previous ruler. The Diwan’s success in extending agriculture was widely admired by the British, for it exemplified the critical connection between the establishment of individual property and the unleashing of productive rationality. His agricultural policies were, in the words of Sir Charles Roe, those of an “able and enlightened” ruler; “by granting leases on liberal terms” and inducing “settlers to break up new land,” he had made himself an agent for progress.⁶⁶ The British thus saw themselves as following in the Diwan’s footsteps as they settled the Multan region, themselves giving numerous wasteland leases conditional only on the sinking of wells and opening the land to cultivation.⁶⁷ And the conversion of such leases into private property was usually conditional only on successfully converting the land to long-term productive use.

On the other hand, many British officials were highly critical of Sawan Mal’s almost complete failure to establish any sort of indigenous community between the ruler and the individual. As the settlement officer of Jhang wrote, Sawan Mal had ignored all notions of community control over the waste. When it came to waste, “the theory that the land belonged to the State” was carried by the Diwan “to far farther lengths than it had ever been carried before.” Previously, “the rights of the dominant tribe had been more or less respected,” he wrote. But under Sawan Mal, there were few village boundaries. “In practice the Diwan held that no man had any right to any land that he could not cultivate, and grants of waste land were given to anybody who could bring it under cultivation.” Indeed, so little did the

“tribal” organization of the people matter that “churas and kamins were in his eyes just as good proprietors, probably better, than Syals and Beloches.”⁶⁸ The relationship of “tribal” status and honor to the landed property order had, in other words, been ignored almost entirely.

For the British, the demarcation of village boundaries and of *shamilat deh* was thus in part an effort to encompass investment in agriculture within a framework that would at least minimally serve the ideological purposes of their own property order by linking property to a language of “natural community”—and, in the process, underscoring the distinctive public authority of the colonial state as the patron of both the individual producer and the tribal community. That the drawing of such boundaries—and the separation of village commons from both individual property and state lands—was problematic in this arid region was widely recognized by the British themselves. But the drawing of these boundaries nevertheless remained an inescapable adjunct to the legitimizing vision of the colonial state’s public role in recognizing both individual property and kin-based community in the settling of the Indus basin. Whatever the environmental constraints, the demarcation of village estates thus continued apace as the British set up the “village” as the legalistic frame for the recognition of proprietary rights. Whatever the environmental differences involved, it was within this framework that competing claimants for “rights” operated as they sought to manipulate the British property order for their own purposes.

The contradictions inherent in the assimilation of this arid region to the colonial property system—and the framework this created for the pursuance of conflicting property claims—emerged clearly in a celebrated court case in arid Jhang district in the 1860s. This was a case whose political importance was suggested by the fact that it attracted, in the words of the deputy commissioner, the attention of the “opposite factions in the district,” because it involved prominent families and dramatized the role of the British property order in framing local competition for power. The case was brought by the Qureshis of Haveli Bahadur Shah, a “village estate” in the Shorkot tahsil. Of relatively recent origin, the village was founded by Bahadur Shah Qureshi, a wealthy servant of the Sikh government, who had invested in the opening of wells with the encouragement of Diwan Sawan Mal and had built a residence (*haveli*) on the land.⁶⁹

When the British first surveyed the district, they had recognized the Qureshis’ proprietorship of the lands attached to Bahadur Shah’s wells. But they had included these lands in a much larger “village estate” that extended from the Chenab riverine to the edge of the Sandal *bar*, and they had incorporated within this *mauza* a vast area of “waste.” Scattered on this waste, at the time of the case, were wells settled by others, perhaps first sunk subsequent to Bahadur Shah’s arrival or perhaps reopened after earlier cultivation—this was a subject of dispute. Whatever the precise situation, a case was lodged when the family of the Qureshi *lambardar* of the village, a descendent of Bahadur Shah, claimed that, even though these new

settlers claimed proprietorship on the basis of having themselves built new wells and opened cultivation, the Qureshis had the right to a proprietary share of the produce from all these wells on the grounds that the entire waste of the village was commons and belonged collectively to the descendants of the founder of the village. The case thus hinged on the Qureshi claim that the waste attached to the village estate belonged as a community to the “proprietary body” of the village, the ancestral proprietors, a claim rooted firmly in the overarching structure of British property law—and the vision of the “village community”—as it had developed in central Punjab.

However, the defendants argued that the Qureshis had no special claim to the waste, since others had acquired a proprietary stake in the village through their own sinking of wells and opening of cultivation. Their claim rested on a principle no less central to colonial property law—that the transformation of waste to productive agricultural use conferred the strongest possible presumption of individual proprietary right. Some of these men admitted that they had paid a share of their produce to the Qureshis in the past. But this reflected, they argued, not a recognition of the Qureshis’ exclusive claim as a community to the waste but rather the fact that Bahadur Shah and his descendants had, as men of capital, advanced money to many of the well owners for well reopenings and repair. Their claim to a share of the crop on such wells was purely the product, in other words, of individual contract, which was central to processes of production. It had nothing to do with the inscription of a proprietary village community on the *shamilat*.

These competing arguments, both deeply entrenched in emerging British property law, were sufficiently strong that the deputy commissioner and the commissioner ruled in opposing ways on the case. The conflicting pulls of these arguments also marked the final decision of the Chief Court of the Punjab. In ruling finally against the Qureshis, the court found no compelling evidence that the Qureshis’ exclusive claim to the *shamilat* had in the past been accepted, noting that the evidence of a statement to that effect from the village administration papers (*wajib-ul-arz*) was an obvious fraudulent interpolation by the Qureshi *lambardar*. It was probably this evidence of written record tampering that decided the case. But, though the court rejected the Qureshis’ claim to ancestral proprietorship of the commons, the judges nevertheless seemed to accept the importance of “custom” as a strong limiting framework for individual proprietorship on the land. Arguing from the language of British settlement reports, the court based its ruling on the evidence that many villages in this part of the province were historically not “village communities” at all but were, rather, “fortuitous” aggregations of wells, with a “convenient *arrondissement* of land” attached to each, a theme that ran through a good part of British revenue writing. Viewed from this perspective, the Qureshis could not claim the *shamilat* as their own.

But in an ironic twist on the principles on which the British based their system of property generally, the court seemed to accept the importance of dealing with arguments drawn from history and “custom” before it could then go on to suggest that the relations between the Qureshis and other well owners were, *in this case*, simply those of contract “between capitalist on the one side, and owner of the well on the other.”⁷⁰ After all, the framework for the law remained the “village estate” mapped onto the land. Framing its decision in terms of a general law of property, the court offered, in other words, no clear general principles for how the claims of productivity and community were to be reconciled in this arid environment. But it suggested how the British property order—with the “village” at its center—had come to define the framework for local conflicts over control of the land even in these arid areas.

Pastoralism and Community

In practice, the relationship between production and community in such regions was greatly complicated by the widespread and varied relationships between agriculture and pastoralism. In most village estates such as Haveli Bahadur Shah, the opening and closing of wells for irrigation was, at least in part, closely related to complex patterns of pastoralism. And yet pastoralism highlighted yet more clearly the principles—and the contradictions—marking the British property order in the arid tracts of western Punjab. Based on wandering, pastoralism of course represented the antithesis of settled productivity and thus of the village as the basic vessel for settled property. By its very nature, pastoralism seemed to defy the drawing of boundaries between “waste” and productive agriculture, which was central to the definition of individual landed property in the village-centered property system. This was, as we saw on the Baloch frontier, often cast by the British not simply in terms of differing adaptations to the environment but in terms of a long-term evolutionary theory linking shifts in environmental adaptation to the progress of individual morality. As Richard Temple suggested in 1853 when first confronted with the nomads of the inter-riverine tracts of arid western Punjab, productive rationality was difficult to imagine without settlement on the land: “Rude races first learn civilization by becoming possessed of property,” he wrote. “. . . Take a wild wanderer of the Bar, give him some land to squat upon and call his own, and he forthwith becomes a wiser and better man.”⁷¹ Such ideas, which echoed earlier theories of human moral development, drew the distinction between settled agriculture and pastoralism in sharp moral terms.

Yet here, too, most British officials understood well that pastoralism could rarely be defined entirely independent of agriculture. Forms of pastoralism in the Indus basin were numerous, from the Pakhtun *pawindahs*, who migrated every winter from Afghanistan into the Punjab plains for purposes of pasturage, trade, finance, and seasonal employment (some working on the winter silt clearance of

inundation canals), to the “multi-resource nomads” of Hissar in southern Punjab, who practiced cattle raising and agriculture, moving their herds both on annual and on drought-induced cycles and marketing bullocks to the surplus-producing agricultural villages of central Punjab.⁷² But most important for western Punjab—and for the subsequent history of irrigation—were those pastoralists who circulated within the great Punjab *bars*, the arid doabs between the five rivers crossing the heart of western Punjab. These were the great pastoral “tribes” of the Sutlej, Ravi, and Chenab, whose migrations extended at the time of annexation to within thirty miles of Lahore: the Kharrals, the Khatias, the Wattus, the Sials, and many others. They moved annually from fixed camps in the high *bar* (known as *rahnas* among the cattle nomads and *jhoks* among the camel nomads) down to summer pastures along the rivers. As the settlement officer of Gugera observed, “[T]he immense herds of cattle, which roam about the centre of both the Baree and Rechna Doab, remain in the vicinity of these Ruhnns from the commencement of the rains till the end of February.” Then, when pasturage disappeared in the *bar* as the summer approached, they moved down toward the banks of the rivers, where vegetation moistened from the previous year’s floods survived the hot weather.⁷³ Unlike the pawindahs, they were not often long-distance traders, though they did market the milk products of their herds, usually through relations with local Hindu shopkeepers.⁷⁴ Most important for the British, however, was the fact that, though migratory, these tribes were not assimilable to the categories “traders” or “laborers,” as were the pawindahs, but were essentially unsettled *producers* from the land—a status that seemed to challenge the fundamental dichotomies on which the British landed property system—and the village—was based.

Many tribes combined pastoralism with some forms of agriculture. Indeed, while often maintaining a belief in pastoralism and agriculture as distinctive forms, many British officials attempted to define such pastoral connections to agriculture as part of an ongoing evolutionary process whose roots preceeded the arrival of the British, and one that had been shaped by the policies of earlier states. In 1877, Lyall provided his own highly schematized history of these tribes:

Before the times of the Sikh and Afghan rule . . . , in the outlying parts of the country the people, who were to a large extent pastoral in their habits, were left very much to themselves, and the dominant races held more or less together in clans. These clans often migrated in force from one country to another; they were semi-independent, and often fought amongst themselves till one subdued or utterly drove out another: they only paid revenue, or rather tribute, to the Government when compelled to do so by superior force. Sometimes they were guided by councils of elders, sometimes they had a regular chief.⁷⁵

However, in the course of relations with a series of powerful states, these patterns had changed as states had deployed military force against them and/or

bought them off with protection money or control over nearby agricultural lands. Yet even as their introduction to agriculture had represented a method of control, it had also begun to transform them. "The more they took to the plough and settled habits," Lyall wrote, "the less they were able to hold together."⁷⁶ In the wake of such relations, powerful chiefs had emerged in some tribes, whose influence was tied in part to the patriarchal authority rooted in tribal genealogy but equally to the revenue from settled agriculture. Under the Mughals, leading Sial and Kharral lineage heads had received jagirs. Walidad Khan Sial, for example, "who was recognized by the Mughal authorities as the zamindar of all the Sial territories," had in the mid-eighteenth century established a powerful regional Sial state, supported largely by an important agricultural base along the Chenab river.⁷⁷ Sikh control in the early nineteenth century had reduced such tribal pretensions to state building. But, in the process, they too had bought off the power of these chiefs by continuing most of their jagirs.

When the British established their control over the region following their defeat of the Sikhs in the 1840s, they recorded the legacies of these vicissitudes as they defined their relations with these pastoralists. Numerous branches of the Sials, in addition to controlling large herds of cattle, were recorded as the individual proprietors of lands in village estates along the Chenab. Many other tribes also held agricultural lands along the rivers, including the Kharrals, longtime rivals of the Sials, whose chief had received a jagir from the Sikhs and who had landholdings recognized in the low riverine lands along the Ravi near Kamalia.⁷⁸ Such landholdings had become critical to structures of lineage organization and tribal power, defining patterns of both competition and authority. Control over settled village estates by important lineage leaders not only provided income from the produce of tenants but also provided control, in some cases, over access to riverine grazing lands that were critical to pastoral movements. Equally important, control over fixed agriculture, forts, and small markets provided a structure for state relationships with chiefly lineages as intermediaries, thus suggesting the importance of "tribal" genealogy even as settled seats of chiefly power became focal points for the exercise of political influence over more far-flung migratory groups. In this, they were like the tomb complexes of Sufi saints located in or near the *bar* (sometimes with attached markets), whose custodians also became in many cases critical intermediaries in state dealings with these pastoral tribes. Such centers reflected a structure of authority, even when some agricultural resources were involved, based not primarily on mapped or bounded territorial authority but rather on the channeling of authority through fixed points of charismatic genealogical influence, whether linked to "chiefly" lineage or to sacred ancestry.

Such fixed points of authority were initially extremely important to the British as they established their power in the arid reaches of the Punjab. But their vision of pastoralists was framed also by the principles of territoriality and landed proprietary

interest guiding the broader establishment of the colonial property order. From this perspective, two features of pastoral “character” seemed to stand out in British writing as defining pastoral relations to the colonial property system: their “turbulence,” and their patriarchal ethos. Whereas the first marked Punjab’s pastoralists as civilizationally backward, the second suggested their important evolutionary role in generating the forms of “natural community” that were so important to the village-based property order.

Whatever their partial connections to agriculture, it was pastoralists’ continuing nomadic movement that, in British eyes, defined their most central cultural characteristic: “turbulence.” This was rooted fundamentally in their lack of an underlying attachment to individual property. It was the stark opposition between agriculture and pastoralism that had, in effect, licensed the British image of the bounded village as the settled—and law-abiding—norm for Indus basin production, and this continued to shape the British imagination. Early British reports tended to see all the pastoral tribes as “addicted” to cattle theft. With the ability to abscond into “heavy jungle,” they had always been difficult to control, feuding among themselves, and occasionally plundering the monied “Khuttees and Hindoos,” traders and moneylenders living in the market centers of the region. This was itself a reflection of the fact that, whether landowners or not, they differed fundamentally in cultural terms from the settled population who were the backbone of the property system. Although the term “Jat” had, in central Punjab, become a marker preeminently of settled productivity, here its meaning was configured in direct opposition to settled acquiescence in government authority. As N. W. Elphinstone noted of the pastoralists of Gugera district, they “are locally known by the name of Jats, in contradistinction to the more settled inhabitants, who call themselves ryuts, or subjects.”⁷⁹ The political dangers represented by this “turbulence” were brought home to the British by their “rising” during the great revolt of 1857, when Ahmad Khan Kharral, leader of the Upera Kharrals of Jhamra, defied the more settled Kharrals of Kamalia, who held jagirs, and led an alliance of tribes that seriously challenged the authority of the British in Gugera district, plundering the town of Kamalia for a week.⁸⁰ Like earlier rulers, the British responded brutally with punitive military force and mass confiscations of cattle, and they attempted to encourage greater agricultural settlement (partly by clearing jangal) as an antidote to such disruptive predilections. But, for many British officials, only the establishment of fixed, individual property could ultimately constrain this underlying “turbulence.”

Yet British attitudes toward pastoralists in the second half of the nineteenth century were also shaped by their interest in the distinctly “tribal” ethos of the pastoral tribes, which was, in the view of some, a critical model for the “natural,” patriarchal kinship organization that the British increasingly saw as critical to property and social order generally. In writing on the origins of “tribal law” and “village

communities” in the Punjab, many British officials pointed in the later decades of the nineteenth century to the influence of pastoralism as the distinctive evolutionary backdrop to the genealogical structure of the village community—the “community of blood”—that loomed increasingly large in the British property structure. The emergence of British social evolutionary thinking, of course, influenced this strongly. But equally important was the logic of the British property structure itself, which tended to define the primordial roots of village community in a vision of “natural” community that did *not* originate in property or in rational processes of production but existed, as in stadial theories of pastoralism, as anterior to it. In this context, pastoralism provided the village community’s logical evolutionary origin, predating the process of settlement. If villages had no histories but their “tribal” genealogies, then it was pastoralism that provided, in a generic sense (and in a world outside the realm of settled production), the roots of a surviving “tribal” consciousness.

Nomadism was thus widely viewed by British officials as the fount of those traits that defined the distinctive patriarchal culture of Punjab’s village communities—even if these could only be adapted to the British property structure within a framework that required the eradication of pastoralism as an *economic* system and “conversion” to settled agriculture rooted in the mapping of individual private property. Indeed, even the “turbulence and courage” of the pastoralists took on a positive cast in this context as the evolutionary source of the Punjabi “military spirit” that, once tamed by the moral influence of private property, became so important for recruitment into the army.⁸¹ Not surprisingly, this did not generally lead toward the recruitment of unsettled pastoralists themselves into the British army, for they lacked the morally disciplining influence (critical for soldiers) that property provided. But the British nevertheless tended to see a historical pastoral heritage as an important input into the “martial” character of the idealized Punjabi “village proprietor” who became the prime target for army recruiting.⁸²

Nothing suggested such connections between pastoral heritage and the patriarchal ethos of customary law in the settled “village community” more clearly than pastoral attitudes toward women. Some officials saw the roots of customary rural patriarchy in stories like that of Mirza and Sahiban, “a very celebrated tale in the Jhang and Montgomery districts,” which evoked a Punjabi cultural world rooted in pastoral pursuits. The story related the elopement of Sahiban, daughter of a Sial chief of Jhang district, with Mirza, a Ravi Kharral. When both were killed by the outraged Sials, as the story went, the Kharrals fought the Sials and their allies to retrieve the bodies, and in the process laid the foundations for a long-lasting tribal feud—a feud that dramatized the defining importance for tribal culture of honor and control over women. The events of the story were offered in British accounts as an explanation for a strong Kharral aversion to daughters (a quintessential marker, in British legal thinking, of the underlying foundations of “customary law”

generally). Such stories suggested, in other words, the primordial tribal values embodied in pastoral culture. Among propertyless marauders, these values had, of course, been carried to extremes. By its very nature, pastoralism was a flawed moral and productive strategy, and the ongoing practice of female infanticide among some pastoralists suggested their strong need for moral reform (which was partly accomplished, in the case of the Kharrals, when the commissioner of Multan was said to have “weaned” them away from this practice).⁸³ But their tribal organization nevertheless embodied the patriarchal principles that the British increasingly came to see as defining the backbone of the village communities of the Punjab. To seize hold of such forms of organization was thus a central administrative desideratum of the British system. More than others, nomads required “civilizing,” but the aim of the British was to settle pastoralists within a framework that could simultaneously establish individual property and link this tribal ethos to the land.

“A LOCAL HABITATION AND A NAME”:
TERRITORY AND TAXATION

The basic British commitment to pastoral settlement was reflected in the early colonial policy of giving wasteland leases to individual pastoral leaders, contingent only on the sinking of wells and the opening of cultivation for conversion into proprietary right. But the key to incorporating pastoralists into the colonial land system lay not just in these grants, which were often significantly constrained by the limited availability of water, but also in defining a framework for harmonizing the pastoralist “tribal” order with the village-based revenue system. Only this would allow the British to “capture” the “tribal” ethos of pastoralists, even as they were drawn into the territorial structure of the village-based colonial regime. And essential to this was, at least initially, an assimilative system of taxation on grazing that largely mirrored the spatialized structure of the village regime.

Nomads are, of course, notoriously difficult to tax. In a few parts of the Indus basin, such efforts had been linked to state building in the past. The Afghans and the Sikhs, for example, had previously levied a distinctive grazing tax in much of western Punjab, known as *tirni* (or *trinni*).⁸⁴ According to G. W. Hamilton, the deputy commissioner of Jhang writing in the early 1850s, the Sikhs had collected this tax through contractors known as *sadar tirni guzars*, each of whom collected the tax from a group of pastoral clients (his “ungee,” or *angi*) and passed the tax along, minus a percentage, to Sikh officials.⁸⁵ These were often clan chiefs, though they acted as intermediaries for far more miscellaneous groups of clients who grazed their cattle in the *bar*, including cattle keepers on scattered wells and in riverine villages. Although the *angi* of particular chiefs changed “by secessions and accessions of graziers,” the structure of the tax was not dependent on territory:

“[T]he tax was collected irrespective of boundaries,” the settlement officer wrote, and payment allowed pastoralists to graze their cattle anywhere in the *bar*.⁸⁶ In Pakpattan, according to British inquiries, the Sikhs had collected the *tirni* in communication with the heads of Kharral clans, even as these clans had shifted their localities with the pasture. For a time, Ranjit Singh, the Sikh ruler of Punjab, had consolidated the entire responsibility for *tirni* collection in Pakpattan on Ahmad Khan Kharral. But when the country was transferred to Diwan Sawan Mal in the 1830s, he had “summoned the heads of tribes to Multan” to obtain statements on numbers of cattle in order to assess the tax.⁸⁷ Based in theory on the enumeration of cattle, the tax was taken throughout without reference to demarcated territorial grazing grounds.

The continuation of this tax proved a critical instrument for the British to attempt to get an initial civilizing handle over these pastoral tribes—but the key for British administration was to adapt it to the mapped structure of the property regime. As Temple had put it in 1852, British *tirni* policy should, above all, be structured so as not to disrupt “our jurisdictions” and the “general harmony of our fiscal plans,” which suggested a concern for the preeminence of mapped territoriality. In early debates on the tax, Temple favored dealing with *tirni* by attaching large, fixed grazing lands to particular village estates for the purposes of *tirni* collection. By marking off responsibility for the lands, it would, he argued, provide a framework for settlement as well, a framework “beneficial both to individuals and the state.”⁸⁸ Most importantly, it adapted settlement to the structure of demarcated *mauzas* in the Punjab—and thus, ultimately, to a vision of “village community” as well.

Indeed, Temple was also motivated by the concern to take hold of and spatialize “tribal community,” seemingly with this model in mind. The prominence of this concern was evident in Temple’s early musings about the operation of landed property on the *bar* tribes. While stressing the power of settlement and property in individual moral transformation, Temple also suggested that it should be the government’s aim to give to each “community” of pastoralists, even if they continued to wander, an allotment of bounded property that could define a relationship between “tribal” identity and the land. Describing the situation in the Sheikhupura *bar* west of Lahore, Temple saw the chief goal of the government as creating boundaries where none had existed. In discussing the marking of boundaries for village estates, he thus proposed large allotments of land demarcated on the basis of the preexisting grazing habits of particular groups. “Bar people never wander without a distinct idea of where they are going,” he said. Temple clearly saw this as related to potential processes of settlement, which hinged, in his view, on creating “an affection for the soil.” Such an “affection” was a product not simply of the creation of individual property but of linking property to “old associations” connected to one’s ancestors and one’s history—of establishing, in other words, a nexus between “natural community” (and “blood”) and a territorial home. As J.G.

Barnes, the commissioner at Lahore, commented in supporting Temple's proposal, the aim would be to give each community "a local habitation and a name—to create an interest and identity in a particular section of country."⁸⁹ Recognition of this, Temple suggested, could begin to establish a pattern that would harmonize pastoral occupation of arid areas with the underlying assumptions of the British property system.⁹⁰

Whether *tirni* collection could be effectively attached to village organization proved, however, to be a difficult and contentious issue. One instrument for this lay, of course, in adapting the collection of *tirni* to the procedures by which the British attached blocks of "wasteland" to village estates as "village commons." In some arid districts, the British attached large areas of grazing lands to villages bordering on the *bar* as "commons," or *shamilat*, with the explicit suggestion that this might encourage the extension of settlement on these lands within the framework of village organization. The aim in such areas (where semi-pastoral lineages held well lands close to larger grazing grounds) was precisely to encourage the extension of individual, agricultural property at the expense of pastoralism, thus gradually consigning pastoral "wastelands" to an ancillary productive role within the village economy. In parts of Gujrat district adjoining the *bar*, for example, the settlement attached uncultivated "waste" to proprietary lands in the ratio of almost five to one, in the hope, as the settlement officer put it, "that the people will soon depend upon the produce of the cultivation and not upon their cattle for subsistence."⁹¹ In the Thal, the British initially included even larger areas of waste within village boundaries, in the expectation that this would encourage the extension of proprietary interests by structuring the collection of *tirni* on "foreign" cattle as a "village" entitlement, thus encouraging a village proprietary interest in grazing tracts.⁹² In one extreme case, in Shahpur district, a village estate with only 800 acres of individual property, scattered on several hamlets, was incorporated as a *mauza* with almost 40,000 acres of grazing "commons" within village boundaries. Such a case, in which a "few cattle-owners" were allowed to lay common claim to an "immense area," in the words of one official, also suggested the contradictions in this strategy, for in such circumstances this hardly guaranteed that grazing would be subordinated to agriculture or that the commons would be viewed simply as "waste" marking the village shares of individual landed proprietors.⁹³ Many British officials themselves ultimately recognized this. As the settlement officer of Jhang observed, despite (or perhaps because of) the inclusion of large quantities of waste in village estates along the Chenab, "the proprietors do not hesitate to neglect their fields for the sake of their cattle."⁹⁴ Nevertheless, many British officials saw the inclusion of large areas as waste in villages near the *bar*, and their potential use for the collection of *tirni*, as providing a framework in which the pastoral grazing of "wasteland" could, at least in outline, be assimilated into a mapped village property structure—and to a structure of "village community."

In the extensive wastes of the high *bar*, however, the problem of assimilating grazing into a mapped proprietary ethos and into a territorial structure of *tirni* collection was far more marked. In districts such as Jhang, Multan, and Montgomery, with relatively few wells in their central *bar* tracts, large herds grazed over considerable areas with little reference to particular *mauzas*. In the early years of their rule, the British had constituted much of this land as state *rakhs* and relied heavily on the unmapped genealogical (and patronage) influence of tribal chiefs and of Sufi shrines (whose influence extended over many of the *bar*'s pastoralists) to exert their influence.⁹⁵ In such cases, taxation depended not on territory but on enumeration of cattle, which remained highly problematic. Still, British interests dictated even there, as Temple's comments had suggested, an effort to push the structure of grazing toward territorial limitations, and for this the structure of *tirni* collection in the *bar* became a critical instrument. In spite of the difficulties in encapsulating *bar* grazing within villages, the government gradually attempted in these districts to demarcate bounded grazing grounds (known as grazing *chaks*) that could provide the foundation for *tirni* leases to both contractors and "tribal" leaders who were assigned responsibilities for revenue collection in fixed territories.⁹⁶ This was an effort to gradually encapsulate pastoral movements within British administrative and fiscal boundaries, paving the way, at least theoretically, for the assimilation of pastoral tribal organization into the British system.⁹⁷

But such practices were marked by contradictions. In the eyes of many officials, such territorialization of grazing was only a prelude, of course, to the encouragement of agricultural settlement, for, despite the obvious inconsistencies in this position, the logic of the British system dictated that pastoralism, as an activity linked to "wasteland," could only be viewed as inherently "unproductive." In its ideological underpinnings, the grazing tax was thus quite different from the land tax. It was not conceptualized as a tax on a particular form of production, marking the state as a patron of productivity. Rather, *tirni*'s significance, for many officials, lay precisely in its value as an instrument for encouraging pastoralists to settle. The political aspects of this were evident in the British levy of a punitive *tirni* on pastoralists after the rebellion of 1857, when many Punjab officials viewed pastoral cattle-owners as the chief culprits of the rebellion.⁹⁸ This idea persisted when the Gugera district was settled not long afterward, and the settlement officer argued for a uniform and high *tirni*, not as a tax on production but as a mechanism to "induce the pastoral tribes" to give up pastoralism.⁹⁹ The concern to make the long-term unprofitability of pastoralism clear reached its pinnacle when the commissioner of the Multan division, Arthur Brandreth, enunciated it in 1869 as a general policy: "You should inform" the contractors for grazing *chaks*, he told the deputy commissioners, "that we do not want grazing to be profitable and would rather they settled down and took to agriculture."¹⁰⁰ In such a mindset, *tirni* became an instrument encouraging tribes to give up wandering altogether, shifting within

the limits of demarcated tribal territories toward a far heavier reliance on the only truly productive use of the land—settled agriculture.

Nevertheless, as even many British officials realized, the use of a high *tirni* as an instrument of social transformation in this manner brought forth its own contradictions, not least because of the practical difficulties in an arid environment of linking productivity only to settled, individually held land where water was scarce and uncertain. Indeed, the importance of water and its scarcity runs as an undercurrent through all these discussions. As the settlement officer of Montgomery district noted in 1873, the productive relationship between agriculture and pastoralism in an arid environment could only be complex. Many officials, W. E. Purser wrote, had mistakenly seen a high *tirni* as “an act of real kindness to the people,” since it encouraged them to take up agriculture. But many parts of the *bar* were entirely unsuited to agriculture, he noted, and in those with some agricultural potential, capital for the sinking of wells was critical to agricultural expansion, as the provision of water was crucial. Arid lands could not be opened to settlement without relatively heavy investments. “If a well irrigates 25 acres yearly,” he noted, “about Rs. 25 per acre has first of all to be sunk in the land by way of capital before the land can be brought under cultivation. Whence are the individual members of the pastoral tribes to get this sum? Depriving them by a crushing *Tirni* Tax of the profits they derive from their cattle is not at all likely to render them men of capital” capable of investment in agriculture. The people “are in their pursuits semi-pastoral, semi-agricultural,” he continued. “The more they make by their cattle, the more they are able to extend agriculture; the greater their profits from agriculture, the more cattle they keep.”¹⁰¹ A high tax on pastoralism thus ran counter, he argued, to the fundamental British concern to draw out capital investment in order to fix settlement on the land. And in the high *bar*, no amount of financial pressure could force settlement so long as water scarcity mitigated against it.¹⁰²

The contradictory effects of a high *tirni* demand in these circumstances were suggested by subsequent experience in Montgomery district. There, in pursuance of Brandreth’s policy in the 1870s, the government had given *chak* contracts for *tirni* collection in the high *bar* to outside financial speculators, who made extensive use of the courts in an effort to force graziers to pay an extremely high *tirni* collected within fixed *chak* boundaries. The government’s aim was to maximize financial pressure on the district’s pastoralists and thus encourage shifts toward agriculture. But the immediate effects of this policy were quite otherwise. Responding to attempts to collect the tax, groups of pastoralists soon launched an armed assault on the main contractor’s house. Fearing the spread of violence, the British quickly backtracked and shifted the contracts to “*zamindars*” of the villages adjoining the *bar*, apparently in the hope that this would allow them to tap into patriarchal, lineage-based influence even while maintaining a policy encouraging agricultural settlement.

However, the shift only illustrated the ways in which existing relations between pastoralism and agriculture worked against any immediate shifts toward agriculture—or even toward the effective territorial demarcation of grazing grounds within a “tribal” framework. Many of the new zamindar contractors were themselves linked genealogically to the “pastoral tribes” targeted by the British and were men who had long played roles in the expansion of agriculture along the fringes of the *bar*, where the higher spring level had allowed the sinking of Persian wheels. These men exemplified the processes of agricultural “conversion” that the British were encouraging, and yet they maintained *at the very same time* strong interests in protecting access to grazing lands for their own cattle and for those of their clansmen. Indeed, effective access to grass had long required open access to the shifting grass cover in the *bar* in the face of highly variable rainfall. Zamindar *tirni* contractors were thus very reluctant to force pastoralists to graze in bounded *chaks*, which in particular seasons might be unable to meet their grazing needs. After taking the *tirni* contracts, they quickly agreed among themselves not to enforce double *tirni* if *chak* boundaries were crossed. The result, as the Multan commissioner put it, was that, by their “spontaneous action,” they brought a *de facto* end to the *chak* system by transforming the Montgomery *bar* once again into an open grazing ground where a single tax was taken—thus, in the process, seemingly neutralizing government efforts to assimilate it to a territorialized revenue system.¹⁰³

Similar tensions marked efforts to territorialize grazing in the Multan *bar*. As one official wrote of Multan district: “It has always been the habit of all the graziers in the district to vary the localities to which they take their cattle in accordance with the accidental results of the rainfall of the year. And looking at the temper of the clans and their feelings towards each other, I think there can be no question but that the exclusion of one tribe from the favoured spots to the benefit of others, who may have happened in that particular year to lease them, would be strong[ly] provocative to riot and bloodshed.” Though briefly attempted in Multan, the demarcation of effective grazing *chaks* was even less successful there than in Montgomery and was ultimately abandoned in favor of fitful attempts at the enumeration of cattle who were free to graze throughout the *bar*, as most had done before the introduction of British policy. Ignoring grazing *chaks*, the *tirni* demand was ultimately distributed among the graziers by local committees organized by the British, though few officials were satisfied with this.¹⁰⁴

Such results suggested the inherent tensions in British efforts to encourage both individual agricultural settlement and the territorialization of tribal influence within the constraints of a water-scarce environment. While expanding income from the extension of agriculture was, in most cases, congruent with the interests of local lineage leaders, the closing of open grazing through the establishment of *chak* boundaries was not. The influence of many lineage leaders was rooted precisely in their ability to simultaneously extend their productive control over both

agriculture and access to “open,” unbounded grazing grounds, just as we saw earlier among the Baloch chiefs of Dera Ghazi Khan. Here, once again, genealogical influence was linked to the ability of “tribal” leaders to mitigate productive uncertainty in a water-scarce environment. The very effort to territorialize “tribal” influence on the “waste” thus seemed to work against British efforts to draw structures of “natural,” tribal community into the spatialized contours of the village-based revenue system.

Yet the British system also suggested the overarching significance of a property system that gave primacy to individual property even as it sought to capture genealogical community as a countervailing language of order and stability. Indeed, whatever the tensions inherent in British efforts to translate the village property system into the more arid reaches of western Punjab, the structure of that system nevertheless had a profound impact on the evolution of pastoralism—and processes of settlement—in the Punjab. For all the contradictions shaping British relations with pastoralists, even pastoralists could hardly escape the assumptions underlying this structure, though they sometimes sought to turn it to their own benefit.

One example is that of Malik Macchia Langrial, a pastoral chieftain in the Mailsi *bar* of Multan district, whom the British sought to incorporate into their system through the granting of a lease to collect revenue from temporary cultivation within a fixed territory of the *bar*. This was a lease predicated on the assumption that, through such a territorialized lease, Macchia would be given an incentive to expand agriculture, sinking wells even as he maintained his tribal authority. But, in reviewing the history of the lease some years later, one official detailed how Macchia’s own interests had lain in discouraging the extension of permanent cultivation, which might have, in the long run, undermined his control and mediation of access to grazing grounds. Since his interest lay primarily in this grazing, Macchia had sought to use the lease simply to enhance his prestige as a tribal leader in the eyes of his tribesmen in order to maintain his position. A leader “of the patriarchal type,” as the Multan deputy commissioner put it, Machhia valued the lease far more for the *izzat* (honor, prestige) it gave to him than for the return it provided him on temporary cultivation. Indeed, here we can see evidence of a leader negotiating the mixed British concern to extend both agriculture and tribal community for his own benefit.¹⁰⁵ But we can also see how the tensions this generated increasingly marked Machhia in British records as a target of mistrust.

Another example is that of the Shahpur *maliks* (chiefs) who sought to manipulate the principles of village mapping largely in order to maintain their access to large grazing areas. As the Shahpur settlement officer, Gore Ouseley, described it in 1859: “As the people began to learn the worth which is attached by us to possession,” parties of men often “took to ploughing up and sowing small patches of ground not equal in size to a quarter of an acre at distances of from three to ten miles from their villages, the object being to try and make good their title to all the intermediate

grazing land between these patches and their village sites.” This was all intended to influence the drawing of village boundaries so that they could bring large grazing grounds under their control by labeling them as “common” village waste. In adjudicating a dispute between three newly demarcated village estates in Shahpur and Leiah (Mitha Tiwana, Ukhli Mohla, and Roda), Ouseley thus reported that he was “taken by one party or other to see the marks of their possessions, which were little patches of ground . . . scattered over distances of a mile or more from each other, in which somebody had soen a few seeds of bajra.”¹⁰⁶ Here, in the midst of the mapping of estates, an appeal to the power of possession conveyed by the opening of agriculture was used for a goal entirely opposite from what the British intended—to lay competitive claim to large wastelands for grazing.

Such examples suggest how pastoral and semi-pastoral groups had assimilated the assumptions underlying the British property system, even as they has used them to enhance their own access to mixed resources. But these examples also dramatize the role of the environment itself in shaping these developments. As the British sought to extend the “village community” of central Punjab across the province, local officials could hardly ignore the complex intersections of pastoralism and agriculture that defined life on Punjab’s “wastelands.” As such examples show, British assumptions about property remained in critical interaction with the ever-present environmental constraints dictated in this arid region by the scarcity of water.

As the British extended their rule across western Punjab, new projects for bringing water to the land thus took on growing importance in British policy. Increasing access to water was, in the end, the only sure way to make large-scale settlement possible—and to enable the full extension of the emerging colonial property regime across the region. But water initiatives were themselves hardly free from the tensions, relating to conceptions of environment and community, that shaped the structure of law and property. Water control, too, was intimately tied to an emerging colonial statecraft built on “state simplifications,” drawing on the parallel distinctions between “waste” and revenue-generating land, between natural community (“blood”) and production. As we shall see, these “state simplifications” were to play, ultimately, a key role in the larger history of British canal building and water management in the late nineteenth century, just as they did in the structure of property.

Statute and Custom in Water Law

At present the canal-management is one of local self-government which has sprung up on the spot and would, I think, for that cause alone, commend itself to a race who are strongly attached to their ways and methods, because they are their ways. . . . Besides these sentimental considerations, the people are in favor of this plan of each canal being managed by the persons who use it, because they fear that were the State to take the matter into its hands, their own immediate interests would often be sacrificed to considerations of general interest and improvement.

—J. D. TREMLETT, OFFICIATING DEPUTY COMMISSIONER OF MUZAF-
FARGARH, 1874¹

*Without the aid of the rulers, water cannot be had.
Self-willed men can do nothing and know nothing.*

—MUHAMMAD SHAH, LAMBARDAR OF GURDITTIWALA, 1880s²

The power of water development—and particularly canal building—to transform the Indus basin environment was well-recognized by many British officials in the second half of the nineteenth century. Projects for water development went hand in hand with British commitments to fix productive property owners on the land. In undertaking state projects of water development, the state took on the role of a “public” patron of productivity, building canals to supply water to individual producers as they encouraged increasing agricultural settlement.

Yet emerging tensions in water management also highlighted the complicated role that the patronage of local communities, linked to tribe and genealogy, had come to play in structuring the colonial polity. Local community had long played a critical role in water control, too. But uncertainties surrounding the meaning of local community in water matters within the colonial order are reflected in the contrasting visions quoted above. The emerging British commitment to “public” water development is evident in J. D. Tremlett’s references to the growing state concern with “general interest and improvement.” Yet, as his comments also

suggest, local control of irrigation—or what he calls “self-government”—was an equally important British concern, and one that could easily be cast in contradiction to the “public” principles of irrigation management. Tremlett’s framing points toward the ways that the British increasingly emphasized their role both as patrons of irrigation expansion in the name of a general community of producers and as patrons of local “community.” These two sides were reflected in the late nineteenth century in an emerging structure of water law that relied on two distinct, overlapping but conceptually differentiated forms of legal oversight: statute and custom.

The relation of these forms to actual questions of water management was a complex matter, as is suggested by the juxtaposition of Tremlett’s comments with a quotation from a *lambardar* (village headman) of Ferozepore district. Here the dichotomy between “public interest” and local community “self-government” looks quite different. However important a commitment among the people to *their* ways, as Tremlett put it, the implication behind Muhammad Shah’s framing is that the concept of a regime of local “self-government” in water matters, conceived as entirely independent of the state, was a fantasy.

The meaning of local community in irrigation matters—and its relation to state irrigation management—was thus a subject of considerable debate in the late nineteenth century as the British moved toward increasing investment in canal building. As we have seen, the British had tried to define the realm of local community in their property system as one conceptually distinct from processes of production—projecting village community in its essence as an artifact not of productive cooperation at all but of the “natural” bonds of blood and ancestry. Yet when it came to water, with all its critical productive powers, questions of community mobilization often took on very different connotations. In the result, the meaning of “local community” in irrigation proved a contested and uncertain one—and in ways that have continued to complicate debates on the role of community in irrigation matters right up to the present.

STATUTE AND INDIVIDUAL PRODUCTIVITY

The vision of the colonial state as the patron of “public works” was one that came into its own in the second half of the nineteenth century. Earlier champions of public works, such as Sir Arthur Cotton, had complained bitterly about the limitations in the East India Company’s commitment to irrigation projects in India in the years before 1858. As he wrote caustically in 1854, “[T]he motto hitherto has been: ‘Do nothing, have nothing done, let nobody do anything. Bear any loss, let the people die of famine, let hundreds of lakhs be lost in revenue for want of water or roads, rather than do anything.’”³ Under the company, public works had been sacrificed, Cotton argued, to an almost mindless preoccupation

with current revenue and land tenure—that is, to the colonial regime’s property structure.⁴

However, the government’s approach to irrigation works had already begun to shift in the 1850s, signaled by Lord Dalhousie’s establishment of a central Public Works Department in 1855 and civil departments of public works in the provinces throughout the 1850s. After the end of the company, the provision of water came to be seen clearly as an important adjunct to the state’s new “public” role in unleashing the productive potential of private property. Although this was constrained initially by financial pressures after the events of 1857 (and by a concomitant, if brief, interest in turning to commercial investors to develop irrigation works), by the mid-1860s the government had begun to stake out a clear position as the sole “public” provider of irrigation water to private users—even if it had to borrow capital to do so.⁵ In 1867, the government of India appointed its first inspector-general of irrigation, Sir Richard Strachey, who was “given authority to lay down a uniform set of principles to be followed in the design and management of irrigation, determining the capacity of the works, the regulations of the distribution of water to districts, villages and individual cultivators and the assessment of charges for the water supplies of irrigation.”⁶ The value of state irrigation development was now contrasted sharply with private development by Sir Henry Maine, legal member of the Viceroy’s Council, who noted the policy dangers in allowing private property claims in water to challenge those of the state. Indeed, control over water came to define a central element in the new “public” character of the colonial state’s claim to legitimizing authority.⁷

The 1873 Canal Act

These were the attitudes that shaped the critically important Northern India Canal and Drainage Act of 1873, which came to provide the basic statutory frame in north India for state-led irrigation development. As Strachey told the Viceroy’s Council in laying out the justifications for the Canal Act, the time had come to move more comprehensively from “discretionary government to government by law” in water matters, and this involved asserting the state’s ultimate claim to public authority over all irrigation water.⁸ Indeed, the basic principle of the law was laid out in the act’s oft-quoted preamble: “Throughout the territories to which this Act extends, the Provincial Government is entitled to use and control for public purposes the water of all rivers and streams flowing in natural channels, and of all lakes, sub-soil water and other natural collections of still water.” The act thus asserted at the outset—in sweeping terms—the government’s claim to “use and control” over *all* irrigation water.

The extent of this claim to state ownership over water astonished some foreign observers. As one American commented, the government’s claim in the Canal Act to “absolute right” over “the waters of all streams and lakes” was beyond anything

that could be contemplated in the United States (except perhaps in unsettled territories).⁹ But some government officials explained that this claim to a sovereign state right of control over all water was not quite so sweeping as it first appeared, for it hardly operated to the exclusion of all other claims or rights to usage.¹⁰ The claim to ownership of all water was in some ways akin to B. H. Baden-Powell's notion with respect to property in land that the state's aim was to assert an autonomous position from which it could distribute property claims according to rational principle, thus allowing it to shape water management according to past claims and to reason (and to the "general" good). The state's claims in the 1873 act, however, went well beyond its role in the structuring of state claims over land. As Maine noted in his original statement of the act's "objects and reasons" in 1869, the government reserved the right to resume "and redistribute the water in the way most conducive to the good of the community at large," which implied the mobilization and direction by the state of a community of individual producers defined by the principles of highest *productive* water use (a principle central also to maximizing the state's revenue).¹¹

The Canal Act empowered the state and its officers, generally engineers and their subordinates, to control and manage water "for public purposes" in an encompassing way. It defined what powers they had in taking up lands and executing canal projects, what powers they had in distributing or stopping the flow of water, and what charges they could assess to the water users (or "occupiers," in the act's terminology). Farmers were expected to pay for water through water rates (*abiana*) that were calculated *not* as a direct charge for a specific volume of water but as a charge taken on the produce from land that was irrigated. Water itself was thus never *directly* paid for as a commodity. It was instead the productive results of the application of water (that is, irrigated crop return) that was taxed, a framework that facilitated a vision of water as a "public" good linked to enhanced production. Water buying and selling were strictly forbidden under the act, as *abiana* was paid only for the right to grow irrigated crops by *using* canal water supplied for a particular piece of land, not for individual ownership over water itself. Even as it framed a nexus in water law linking the state and the individual, the Canal Act thus offered no foundation for the formal acquisition of private "rights" in water at all.¹²

Framed in this way, the "public" structure of water delivery was sharply differentiated from the structure of property law—and this suggested a key difference in its relationship to local "custom" as well. If individual property rights in land were widely viewed in the Punjab as conferring individual rights even as they bound individuals to a local, genealogical community of proprietors, water deliveries as conceptualized under the Canal Act carried no such rights, nor any association with local "customary" communities at all. Quite to the contrary, the act underscored the right of engineers (indeed, the *duty* of engineers) to allocate water

according to principles of efficiency and concern for the public good that fundamentally trumped the role of “custom” in water usage or distribution. The imagined community of engineers and users that underlay the contours of the Canal Act was one projected in sharp contradistinction to the principles defining the local, “natural” communities that had gained such an important place in the property order in rural Punjab.

From the beginning, the actual operation of the act underscored the deep tensions that existed in the projection of such a vision onto a society in which such communities occupied an important position in the social and political landscape into which water flowed. It is important to stress that this was not because the principles embodied in the Canal Act were fundamentally foreign to Indus basin water users or a complete departure from indigenous assumptions. To the contrary, in certain respects the idea of a system supplying water only for productive use, and not as an owned commodity, was one that had powerful echoes in popular perceptions of Islamic law, under which water, unlike land, was a gift from God, a “public good” supplied by God but delivered by the ruler. Nor were these ideas in any fundamental opposition to existing distributive practices in many parts of the region. Indeed, as one engineer noted, long-standing arrangements with respect to upstream and downstream users (called *saroba* and *paina* irrigators, respectively) often reflected similar ideas about the underlying “public” nature of water and its “use,” rather than to delineated water “rights.”¹³

Nevertheless, contradictions between “customary” forms of water control and the statutory authority of engineers under the Canal Act were significant, for they were deeply embedded in the structure of British ideology and administration itself. It was far less a distinction between indigenous and foreign ideas that shaped the system’s underlying tensions in the wake of the Canal Act than a contradiction deeply embedded in the structure of colonial thinking itself, within which “rational” administration and “customary” administration operated in fundamentally different registers, reflecting different underlying visions of the forms of human community that they constructed. As Chhatrapati Singh has argued, the basic distinction between customary “rights” and the structures of control embodied in the Canal Act lay in their grounding in two alternative, underlying conceptions of rights and of the person: the one (custom) embodying “pre-capitalist customary conceptions of group rights,” and the other (statute) embodying “a parallel set of post-capitalistic individual rights, vested in the ‘egoistic man.’”¹⁴ Yet when linked in common time, these represented not past and present but simultaneous, countervailing visions, structured by the power of nature itself to produce conceptually opposing visions of community. And *both* visions—as we saw in the last chapter—remained critically important to colonial administration and law, even as they were framed in colonial statecraft as embodying antithetical conceptions of the person.

Statute, Custom, and Water Rights: The Bari Doab Canal

How then, specifically, did the authority of statute and custom interrelate in defining access to and management of water? And more critically, what did the structure of colonial water law imply in terms of the role of local communities in water management? Far more than the plain language of the Canal Act, it was debate on these questions—and on the implications of these questions for defining the state's role in the management of water—that shaped the role of irrigation within the emerging developmental order of the Punjab. Such debates also suggested how deeply intertwined questions of irrigation were in these years with the articulation of the principles that guided and legitimized British statecraft more generally.

No example illustrated the tensions embedded in the operation of the Canal Act more clearly than its application to the Bari Doab canal, which had been opened in the 1850s. Taking off from Madhopur on the Ravi river, the canal irrigated a large area in Gurdaspur, Amritsar, and Lahore districts, occupied largely by settled “village communities” that supplemented canal water with irrigation from wells. Though constructed originally with concerns for political pacification at the forefront, the canal came to provide a laboratory on which many of the ideas that defined the 1873 Canal Act were first worked out and elaborated.

With its administration bureaucratized in accord with Irrigation Department rules, the canal was conceptualized from the beginning (even before the Canal Act) as delivering water to individual farmers in return for the payment of water rates. The Irrigation Department itself fixed the amount of water (or, more accurately, the numbers of pipes) allotted to a village on the basis of its acreage and irrigation intensity, and then it worked out the placement of the pipes (grouped as outlets) and the construction of watercourses in consultation with the villagers so as to deliver the water proportionally to each individual holding. “On the Bari Doab Canal we have dealt principally with individuals,” a canal officer wrote. “The name of every man using the water of a watercourse was registered from the commencement of the irrigation; if he did not get his water he complained, and the case was inquired into, and his rights enforced by the Canal Officer.”¹⁵ It was in this sense, as Elizabeth Whitcombe has written of the Ganges canal, that the Bari Doab was “a thoroughly public enterprise”¹⁶ rooted in a commitment to production linking individual and state—and one whose administration helped to provide a model for the 1873 statute.

But the Bari Doab flowed through an area of wells, in which rights to water had long been recorded also as subject to the operation of custom and share-based customary law. In central Punjab, as elsewhere, the sinking of wells and the opening of land to cultivation had long served as the bedrock for the establishment of individual proprietary right. Wells, and the rights to the use of their water, were commonly jointly held in this region in terms of shares.¹⁷ It was thus easy enough to imagine shares in jointly constructed wells as arising from a form of implicit

contract and driven ultimately by individual productive interests. Such shares normally carried with them rights to water “use” framed in terms of water turns (known as *waris*), a form of jointly agreed-upon water sharing that implied a cooperative sharing of well operation. As one British official wrote in the 1860s in describing the operation of water shares in this region:

[I]t is my experience among natives that in the fair and equitable division of a share they are unequalled by any nationality. In the thousands of wells which are studded all over the country there are innumerable and minute shares existing in almost every well, that oblige each owner’s bullocks to be yoked and unyoked at certain stated times of the night and day, to take the place of or to make room for the cattle of another shareholder. . . . Disputes or quarrels in such minutiae seldom or ever come into our courts.¹⁸

Cast in this way, such share-based systems of water use on jointly constructed wells could be seen as intimately related to the establishment of individual land rights, which depended on availability of water, and suggested how collective local water management and individual productivity were intimately linked. Indeed, so important were these timed water turns as an expression of rights acquired through well-building that, in some more arid areas (particularly when agriculture was impossible without such wells), the term *wari* (turn) rather than the word *hissa* (share) was used to describe not only water rights but also land rights on the irrigated areas surrounding wells.¹⁹

Whatever their origins in productive investment, however, shares in wells (and thus in rights to water) had commonly been recorded in village administration papers (*wajib-ul-arz*) as an aspect of village “custom,” and they thus came to carry the common meanings attached by the British to that term.²⁰ This was underscored by the recording of such turns in village records of rights as a form of “custom” during land settlements, for well water and canal water alike.²¹ Much in the manner of rights in village common land (or the commons of village segments), the British usually recorded such rights in the form of genealogies, seemingly distinct from cooperative production, showing how ancestral shares descended according to the logic of “blood.” As the settlement officer of Amritsar district wrote, “[T]o determine the shares, it was necessary to draw out a tree of each well, showing the original division when the well was sunk, and the subsequent branches.”²² These, of course, mimicked the genealogies that were so important in the recording of common land rights and in the genealogical constitution of the village community. The forms given to the recording of such shares tended to frame them not in the logic of contract, or in the adaptation of such systems to productive needs, but rather in the logic of “custom” as a realm deriving preeminently from the independent power of blood and ancestry—and of “natural,” status-based community.

It was preeminently the structuring of “custom” as a category within the colonial legal regime itself that had thus often configured such share-based systems of collective water control in conceptual opposition to the “rational” statutory principles underlying water administration under the Canal Act. Yet this did not prevent some early British administrators on the Bari Doab canal from trying to mobilize such share-based communities in the development of effective local canal water distribution systems. This was evident in the comments of Leslie Saunders, who, as settlement officer of Lahore district in the 1860s, was the first to try to settle the district’s revenue on the canal. For Saunders, water-sharing arrangements among the irrigators themselves were central to any effective system of canal administration. To structure canal management simply on the basis of relationships between the Irrigation Department and individuals was to open the villages to the interference of an “army” of bureaucratic Irrigation Department “understrappers,” as he put it, who in attempting to redistribute the water directly to individuals would inevitably undermine existing community water-sharing structures. Far better, Saunders argued, was to let the village communities themselves distribute shares in canal water much in the same ways that villagers managed their own turns on wells. It would only be necessary, he wrote, “to collect all interested people, to allow them to elect their own managers and referees, and then to leave all minor matters of distribution, etc., in their hands.” To avoid disputes, shares and rights in water, as well as other matters of distribution arranged among villagers themselves, could then be recorded by government.²³ Critical, as Saunders saw it, was that local, nonstatutory forms of water management and water rights be recognized and incorporated into the larger structure of water management that had shaped the Bari Doab canal.

Such ideas proved extremely difficult to implement, however, not least because of the genealogical meanings already imparted to share-based communities within the British revenue system. As one official noted in the 1870s, “Every zamindar applying for water wishes to have it either alone or with men belonging to his own *patti* [or *taraf*],” and, if it were possible to arrange this, then “so much the better,” as it would “save constant disputes for some time at least.”²⁴ But engineers were extremely wary—for reasons of both control and efficiency—of allowing structures of irrigation to be too closely tied to the genealogical divisions of villages, as this same engineer made clear. Genealogical divisions of the village had been largely cast within the land revenue system in a language distinct from that of cooperative production, and this was generally reflected even in the physical distribution of village lands into genealogical segments:

Every village is divided into *pattis* or, if small, at least into *tarafs* but always into *tarafs* first, and these again into *pattis*, and in, I may say, nearly all cases the division has been field by field, so that a *patti* is spread over the whole village; again, when this

patti was further divided among the *clan* to which it belonged, they again had a field by field distribution, so that nearly all owners, unless they have only a field or two, have land all over the village.²⁵

Little wonder that most engineers were extremely wary of the importation of “customary rights” or existing share-based communities linked to the colonial property structure (or, indeed, of any “combinations of zamindars made by themselves,” as this engineer put it) into the formal irrigation structure, for it would make action on the *principle* of efficient water distribution impossible.²⁶ The Canal Act empowered canal officers to frame formal distributional schedules of turns for canal water in villages if requested to do so by the villagers, schedules officially called *warabandis*.²⁷ But these were usually based on shares in irrigation calculated on the basis of individual plots of irrigable land—*not* genealogy—and were not intended to convey any sort of heritable *right*. They were thus quite different, at least in legal theory, from customary shares recorded in the record of rights.

As the arguments on these issues suggested, the tensions in the operation of the Canal Act in the Punjab—and the complexities in the relationship between statute and custom that defined colonial water law—were significant. Although many officials were, for political reasons, very attentive to the importance of “local self-government” in irrigation matters (as Tremlett put it), they recognized clearly that local “customary” communities operated in ways that could not be easily divorced from the dichotomies and assumptions shaping the local colonial property structure. Once water flowed out of canals and onto village lands, it inevitably flowed, as Whitcombe has put it in describing the Western Jumna canal, into the “thicket of local property rights” that shaped the broad colonial political order.²⁸ The underlying problem was to balance the practical dictates of local water management, including the imperatives of both distribution and maintenance, with a legal property structure within which “community” had been cast as a critical, stabilizing element at the base of the British political order—defined preeminently not in terms of productive cooperation for efficiency but in the “natural” language of genealogy.

THE DILEMMAS OF “CUSTOM” IN WATER MANAGEMENT

The problems of reconciling the defining dichotomies of the colonial property order with the structure of local water management were perhaps most clearly articulated about a decade after the Canal Act’s passage in a penetrating memorandum written by James B. Lyall, who would shortly become lieutenant-governor of the Punjab. Given the state’s overarching statutory claim to control—for “public

purposes”—all water in the Punjab, Lyall’s concern was to define the continuing rights and roles of local communities in water management. Lyall had no doubt that “custom” was a category critical to British administration, a concept within which community-level rights and practices were officially recognized. But his memo also suggested the considerable complexities in applying the concept of “custom” to the management of water as a distinctive case.²⁹

To understand these issues, Lyall focused less on the application of “custom” and “statute” on government-run canals than on the many indigenous canal works that either pre-dated the British or were products of the earliest years of British rule. These were found all over the province, from the relatively large inundation canals of southwestern Punjab that had been developed in the late eighteenth and nineteenth centuries (in Multan, Muzaffargarh, and Dera Ghazi Khan districts, some of which we have already discussed), to the small canals of Punjab’s submontane and hill regions (in Gurdaspur, Sialkot, Gujrat, and Kangra districts), to the more politically charged canals of the districts on the northwest frontier (in Bannu, Kohut, Peshawar, and Hazara) (see map 4). To examine these canals provided clues to the larger issues shaping management on government canals as well.

The chief question, as Lyall saw it, was how the operation of pre-British canals could be defined in relation both to the structure of the colonial legal regime and to the requirements of local water management. Lyall assumed that most indigenous canal systems had their own internal, independent dynamics, which he conceptualized as both temporally and structurally prior to the principles of the Canal Act—and, indeed, to the principles of colonial rule. But the question was whether these constituted a customary realm whose operation could be adapted to the larger structure of colonial legal order and to the role of custom within it. Some officials had tried to deal with the particularities of local canal operation, Lyall observed, by undertaking studies of which canals “belonged” to the people on the basis of their own independent roles in their construction, as opposed to those undertaken on the authority and initiative of the state. But this provided little guide to a distinctive “customary” realm, since most historical evidence showed that the majority of Punjab’s early canals had been a product of *joint* state and irrigator action.³⁰ Equally important, he pointed out that the Canal Act had made clear that *no* canals in the Punjab could be viewed as occupying a realm entirely apart from state legal oversight, for the state was, according to the act’s preamble, the ultimate owner of *all* water in the Punjab and thus at least a “part-owner of all irrigation works drawing water from rivers, streams and lakes,” regardless of how and by whom they were originally constructed.

The central question, then, was how “custom” (as a legal and theoretical category) could be applied by the state in structuring local canal operation. Given their histories, Lyall was clear that the rules of state water control laid out in the Canal Act could hardly be applied directly to most of these works for a simple reason: the

Canal Act was built on generalizable, utilitarian principles that made almost no room for distinctive *local* variations. Lyall had already explicated the potential dangers in applying general rules to local canals in a memo on the inundation canals of Muzaffargarh district: the rules of the Canal Act, he wrote, “may be equitably applied to persons irrigating from canals which have been constructed and maintained solely by Government out of public funds for the benefit of the largest number possible of the public, but according to my view of the rights and interests in these canals of the zamindars through whose lands they flow, whose ancestors in most cases helped to make them, and who have themselves helped to maintain and manage them, [some] provisions of the Act are too arbitrary to be suitable.”³¹ Given these circumstances, the recognition of local “rights and interests” was therefore essential in Lyall’s view if these were to be effectively run. There were political implications, as well. For Lyall (as for Tremlett), existing usage was important to support “not only on grounds of economy of management, but also on the ground that it tends to preserve and promote self-government.”

Yet “custom” in its normal legal usage was not easy to define or apply in these cases, for local “community” as it operated in water matters was not simply an expression of “blood” and genealogy, a realm distinct from production, but was also rooted in *productive* local environmental adaptations. As such, it could hardly be separated from the state’s rationalizing concerns and be treated in exactly the same way as “customary law.” Flowing water, as Lyall observed, was in its very nature changing, variable, and unpredictable. The division of water often required cooperation across multiple villages in the construction and breaking of small dams for diversions from channels, and, as a result, “disputes as to distribution, position, height and thickness of dams, or the size of openings often occur.” It had thus long been the case that irrigators brought such local disputes to officials of the state for adjudication, and not simply according to the “custom” or independent usages of the irrigators—because changing conditions often made this impossible—but on the basis of maintaining productive efficiency. “Whenever any dispute or difficulty occurred,” he wrote, the irrigators applied “as a matter of course, to Government officers for help and interference.” Any view of “custom” as based simply on past usage, independent of rational, productive concerns, was thus a recipe, by implication, for disaster. And, as Lyall noted, in a reflection of the ideas of the Ferozepore lambardar quoted at the beginning of this chapter, this could hardly be viewed as a colonial imposition, since it reflected the common view of the people themselves. For the state to limit its interference in such irrigation matters in the name of “custom” was, as Lyall put it, “quite contrary” to the people’s own “notion of good government.”

The language of “custom” was nevertheless already deeply embedded in colonial statecraft and reflected in the irrigation “customs” already recorded in village papers, and for many officials this implied the existence of a realm of customary

irrigation practices quite outside the direct ambit of state interference.³² To address the problem, Lyall thus concluded by suggesting that the government might perhaps meet this situation by framing new legislation (or by amending the Canal Act) in order to give explicit independent standing to the “body of irrigators” on such small inundation canals while allowing local officials to interfere when necessary in accord with existing “custom”—or, in default of proved custom, according to “justice, equity, and good conscience,” as were the terms defining the discretion of judges within the operation of “customary law” more generally.³³ But the problems in practically delineating and framing rules for the local authority of a “body of irrigators” were sufficiently daunting that it was not until the beginning of the twentieth century that legislation was attempted, and even then with limited and contradictory effects.³⁴ Indeed, the problem lay not so much in delineating structures of control that actually operated on these canals as in adapting their administration to the structuring assumptions underlying colonial statecraft. When it came to canals, the problem of delineating a realm of “custom” that would both facilitate effective local canal operation and conform to the larger conceptual assumptions structuring the emerging British legal system was hardly an easy one to resolve.

Registers of Irrigation Customs

Even as debates on the meaning of “custom” were going on, the British developed a variety of expedients for incorporating “custom” into canal management, including the preparation in many Punjab districts of special registers, or compendia, of “irrigation customs,” thus creating a legal framework for local irrigation management that could stand outside the statutory structure of the Canal Act. In some ways, these mimicked the compiling of “customary law” collections, but they also differed from them in at least two critical ways, reflecting the distinctive problems in trying to adapt “custom” to the particular dynamics of flowing water. First, these written registers of irrigation “customs” and “rights” (*Rivaj-i Abpashi* or *Haquq-i Abpashi*) were normally arranged not by village or by “tribe” but by the parameters of local canals or irrigation systems themselves. They were thus in their form adapted not to genealogy but to the natural environment itself and (in theory) defined participatory communities in direct relationship to it. Second, the written registers differed from customary law compilations in their presumed purpose and relationship to the courts. In general, these were not intended as guides for the courts, as were compilations of customary law. Instead, they were intended simply to be registers of recorded rights and practices that could theoretically be applied by officials when called in to adjudicate disputes, or as frameworks for the recognition (and guidance) of autonomous local committees or local irrigation masters who were recognized in these registers for their ongoing, independent roles in local water management. In a certain sense, we can see in these registers attempts

by the colonial state to create frames for encapsulating—and thus maintaining—the structure of these systems, separated from the more complex structures of colonial law and administration. But, as their workings suggest, the underlying conceptual dichotomies shaping the place of “custom” in the colonial legal order powerfully influenced their operation and defined the conceptual frame in which they operated.

Lahore District. An early example of a recourse to the recording of custom in an irrigation “agreement” was provided by Saunders, the settlement officer of Lahore district, whom we have already encountered above. Saunders was, as we have seen, an early champion of the recording of customary irrigation arrangements as an example of indigenous “self-government” in irrigation matters, which he had sought to inject into the larger bureaucratic administration of the Bari Doab canal. He also tried to adapt the concept of recorded “irrigation customs” to the management of older irrigation works that the British had inherited at the time of annexation.

The centerpiece of Saunders’s concern with the recording of historically based “custom” in irrigation in Lahore district related to the Degh nala, a small, multi-stranded stream that debouched from the hills in Sialkot district and flowed across the plains before joining the Ravi south of Lahore city.³⁵ At the time of annexation, the Degh supported a range of irrigation works that were most developed in the area directly west of Lahore. As Saunders noted, in the 1860s there were upwards of 100 villages in Lahore district alone (which then included much of what later became Sheikhpura district) that were dependent on Degh irrigation. Many villages used *jhalars*, or Persian wheels fixed on the banks of a stream, to raise water to their lands, while others depended on direct flow from the stream, which was controlled through the periodic construction and breaking of small *bands*, or dams, that directed the Degh’s water in turn to different branches of the stream and to different villages. Management of these *bands* required a high degree of cooperation among the villages, particularly during periods of low flow in the winter season, and it was the structure of this cooperation that lay at the heart of Saunders’s understanding of indigenous irrigation.

To preserve and stabilize this system, Saunders ordered the recording of the Degh’s customs in a written “agreement” with the irrigators, which was appended to his Lahore settlement report. Though not a register of irrigation “customs” per se, this was an attempt to reduce to writing the practices formerly involved in local irrigation management. The past practices recorded were numerous, but the heart of the agreement lay in the delineation of rotational rights to water among villages along the various branches and strands of the Degh. Each village was required, under the agreement, to open and close small village *bands* along the stream at stated times in order to guarantee to each village fixed amounts of water (or, more

accurately, fixed times of water use, calculated in terms of days, *pahars*, and *gharis* of water flow).³⁶ They were also required to provide labor for maintaining, guarding, and breaking at the appropriate times the larger dams controlling flow to each stream channel. By embodying these arrangements in a written agreement, Saunders sought to capture the trade-offs between operational maintenance responsibilities and vested “rights” that lay at the heart of customary irrigation—while giving these arrangements state-sanctioned legal standing. His aim was to make it possible, in other words, for district officials (or their appointed “referees”) to officially adjudicate these “rights” while maintaining a system that arose, if not from “blood,” from the social relations among the people themselves. It was “thoroughly understood and acted up to by the people,” Saunders wrote, and had “been in force without any interference on the part of Government for many years.”³⁷

To fit the system into the conceptual oppositions that defined emerging visions of British government represented the central problem. As Saunders saw it, the state was not so much an active player in this system as simply the recorder and adjudicator of the practices that had grown out of the “customs” of the people themselves. But the records provide some hints that the system had not developed quite so independently of the state as Saunders’s comments indicated, and evidence suggests as well that subsequent state decisions may have exerted a considerable influence on its working, particularly as increasing withdrawals in Sialkot district upstream, encouraged by the British themselves, affected the Degh’s flow into Lahore.³⁸ Although we have little evidence in practice of how Saunders’s “agreement” subsequently operated, the tensions it contained suggested clearly Lyall’s strictures on imagining any system of preexisting “customary” rules as originating wholly independently of the state and only requiring government recording for government adjudication. The Degh system illustrated the problems in assimilating local canal management to the larger structure of “custom” as a key legitimizing element in the British system.

Kangra District. Developments in Kangra, a district in northeast Punjab that was settled in the period between 1865 to 1872 by Lyall himself, provide further perspective on the recording of irrigation customs. A largely hill area with a considerable quantity of land in forests, Kangra had its own environmental constraints that had long shaped the distinctive trajectory of local canal management there, as the historical work of J. Mark Baker has shown.³⁹ Indeed, questions about the meaning of local “community” were shaped by the same tensions we observed in western Punjab as the British had attempted to adapt normative, central Punjabi visions of “village community” to a very different sort of landscape.⁴⁰

This provided the backdrop for British efforts to deal administratively with the small, relatively self-contained canals, or *kuhls*, that provided the bulk of irrigation in the district. When Lyall settled the district, he found that both forest rights and

the management of kuhls had been profoundly shaped by the policies and actions of the earlier Hindu rajas, who had also used the patronage of temples to shape relations with local “communities” and thus with canal management. Local canal operation was, as Baker has argued, deeply integrated into the larger principles of legitimation that shaped earlier systems of rule.⁴¹ In order to argue for the independence of local management principles from the dominant bureaucratic models of the British, however, Lyall sought to label these traditions as deriving from a “customary” realm altogether outside the ambit of state authority. This was a critical rhetorical fiction necessary to legitimize a system of management independent of the Canal Act’s principles. When he settled the district in the 1870s, Lyall thus ordered the preparation of registers of “custom,” or *Rivaj-i Abpashi*, detailing each canal’s history and “customary” usages, generally subsuming under this rubric practices that had been shaped by relations with earlier rajas.⁴²

As elsewhere, much in these registers related to the linking of maintenance responsibilities to the water rights of the various villages along each kuhl. Each register included a map showing the canal weir and channels as well as “an attested record of the custom governing the relations of the different communities interested in respect to height of dams, shares or turns of water, repairs, etc.”⁴³ But the *Rivaj-i Abpashi* also delineated local structures of management for each canal that centered on the authority of local watermasters, or *kohlis*, men whose authority frequently dated back to appointments by earlier rajas. These men had historically distributed water between villages and had facilitated interactions between different kuhls, managing the periodic shifts in kuhl alignments, diversionary structures, and changing irrigation patterns necessitated by earthquakes and floods.⁴⁴ They were, in a sense, reservoirs of local knowledge. They were thus not just enforcers of fixed custom but were also authorized to act in the name of the “irrigating community” in adapting management to changing conditions. Most of these men held their positions as *kohlis* by family right (or *warisi*) originally bestowed in most cases by the Hindu rajas who had originally sponsored the canals.⁴⁵ But within the new British system, their authority was now relabeled, in effect, as an artifact of “community,” thus conceptualizing it as anterior to the state’s rationalizing statutory authority. “The management rests entirely with the people, who receive no assistance from the Government,” a later official commented. “They maintain an organized staff of officers called *kohlis*, every village supplying its representatives who patrol the water-courses to prevent theft, stop leakages and to distribute the water.”⁴⁶

Such a system provided a far more dynamic frame for local management than existed in the Degh “agreement.” Indeed, it may have provided a model for Lyall’s later suggestions for possible provincial legislation. But the system’s subsequent workings still demonstrated the inherent tensions in the attempt to fully adapt colonial conceptions of efficient canal administration to the realm of “custom,” configured in its very nature as being anterior to the state. As Baker has suggested,

the workings of Kangra's *Rivaj-i Abpashi* registers produced their own tensions, for, not surprisingly, local disputes still came to British officials (or to the courts) for adjudication, whatever the framework of "community" administration that the system was theoretically based on.⁴⁷ As Alexander Anderson noted when he revised the Kangra settlement in the 1890s, "The management is yearly becoming more difficult. In former time the Kohlis or distributors of water were appointed by the Rajas, and got certain dues. Now they are appointed by the right-holders, and there is not infrequently difficulty in getting them to agree. The Revenue authorities are not supposed to have any power of interference, but the people still come to them, and it is necessary to tender advice to the different parties, if not to pass orders."⁴⁸

The inherent tensions between a realm of "custom" (whether rooted in "blood" or otherwise) and the direct exercise of rationalizing state oversight—the tension that Lyall had identified in his 1882 memorandum—thus continued to mark these canals. But, as Baker's work on the longer-term operation of Kangra's kuhls suggests, it was a system that proved relatively resilient in the face of many changes (whatever the pressure of change and differentiation on the kuhls).⁴⁹ "With all the difficulties," as Anderson declared, the operation of Kangra's kuhls, as captured in the *Rivaj-i Abpashi*, represented "a remarkable instance of self-government, and it is wonderful how well they are managed when we consider the many conflicting interests involved."⁵⁰ The reference to "self-government" pointed toward the place of such systems (and of "custom") in the larger structuring of British colonial thinking about statecraft and political legitimation—and to the impact of this thinking on the actual local workings of canals.

Dera Ghazi Khan District. Yet more acute tensions in the operation of such registers of irrigation customs were evident elsewhere, particularly in the districts along Punjab's trans-Indus frontier further to the west. In these arid and politically sensitive regions—districts such as Peshawar,⁵¹ Bannu,⁵² and Dera Ghazi Khan—the British saw conflicts over water as potentially most politically dangerous. We have already seen the tensions associated with water administration during the early years of British rule along the Baloch frontier, and such tensions were ubiquitous also along the Pakhtun-dominated frontier farther north. The potential violence inherent in water conflict in these regions was dramatically demonstrated by a pitched battle over water distribution that occurred not far from Peshawar on the Bara stream in July 1887, an armed shootout among three Pakhtun tribal groups (Khalils, Bar Mohmands, and Kuz Mohmands) that resulted in numerous casualties and much commentary.⁵³

In such contexts, the British saw the use of customary irrigation registers as a particularly important administrative expedient for encapsulating and stabilizing "tribal" relations within the framework of water management. This did not mean that they ignored in this region the political leverage provided by large-scale,

government-constructed perennial canals, managed under statutory authority. To the contrary, political considerations shaped the large Swat and Kabul river canal projects, opened by the British in the 1880s and 1890s, respectively, which took on central significance in British efforts to “pacify” the Peshawar district.⁵⁴ But such projects did not end the continuing significance of many other, older forms of irrigation. Even as such projects were undertaken, the British also used registers of irrigation “rights” to try to stabilize “tribal” access to water on the many old inundation canals that remained critical sources of water in the region, operating outside the statutory framework of the Canal Act.

No district provides a clearer history of the conflicts generated by such registers than Dera Ghazi Khan, where such registers played an important role in local water administration in the years after the British had begun in the 1870s (as we saw in chapter 2) to bring under government management the majority of the originally Baloch-constructed canals in the region. At the time of the first regular Dera Ghazi Khan settlement in the 1870s, Sir Frederick Fryer had come to see such registers as a critical instrument for capturing and maintaining irrigator “rights” in canals, even as the state brought water under increasing “professional” management as it sought to stabilize the frontier. *Haquq-i Abpashi* were thus prepared for each canal, detailing “customary” irrigation rights dating back to processes of canal construction before the British assumption of management. These processes involved not only tribal chiefs but also the mobilization of what Fryer called local “canal communities,” who contributed labor to canal construction (and subsequently to canal maintenance) in return for “vested rights” in water. They also codified the relative rights of upstream (*mund*) and downstream (*pand*) villages in times of water surplus or water shortage. The registers thus provided a framework within which canal officials could be expected to recognize (and defer to) “customary” rights within their own, professional irrigation management.⁵⁵

The history of such registers in Dera Ghazi Khan, however, was quite different from those in Kangra. One key difference lay in the roles of local watermasters, who were in this area called mirabs or (more commonly in Dera Ghazi Khan) maimars. Unlike in Kangra, there was no framework for grounding the authority of such local watermasters as “community” officials, in a language of hereditary office linked back to pre-British royal regimes. Rather, they had emerged from the processes of mid-nineteenth-century canal building and settlement as a mix of men, some paid by the community and others appointed by the state itself. But beyond this, the workings of these registers were also deeply affected by the far more unstable and changing water conditions on Indus canals.

As A. H. Diack noted at the revision of the settlement in the 1890s, alterations in the flow of many canals in the wake of annual—and highly variable—Indus floods had quickly made many register entries, as he put it, “inapplicable.” Yet many British canal officials still remained wary of openly challenging these registers in a context

in which ongoing political sensitivity relating to Baloch tribal influence was significant.⁵⁶ In such circumstances, canal officers considered themselves frequently “bound by the entries in the registers,” as Diack explained, whether “inapplicable” or not, and the result was that irrigation efficiency was ignored in the interest of avoiding “political” controversy. “Bad work and consequently waste of command and water” was the main result.⁵⁷ Indeed, by 1899 the registers had become, as the deputy commissioner put it, “an ever-present obstacle to improvements and remodeling, as at every step some one’s rights were being infringed.”⁵⁸ Increasingly, the recognition of “customary rights” thus came to be perceived as a threat to effective revenue administration in an area where a regular water supply was critical to property and fixed settlement—elements also important to political stability. Accordingly, the use of these registers on the Indus canals came under significant attack, and, by the beginning of the twentieth century, they were discontinued and canal administration in the district was brought fully under statutory rules.⁵⁹

Although this was a different result than in Kangra, it hardly ended the continuing centrality of “custom” as a category in structuring official thinking about water and in defining a vision of colonial stability linked to the recognition of local, “natural” community. This was evident in continuing efforts in the region to adapt the use of *Haquq-i Abpashi* to the region’s hill torrents, even after their use on Dera Ghazi Khan’s Indus canals was discontinued. Conflicts over water on systems of hill torrent (or rodkahi) irrigation were, as we saw earlier, particularly rife in the Derajat. As Diack noted in his settlement report, water continued to be “a fertile source of riots and bloodshed among the Biloch tribesmen in the Pachad” (the area most subject to torrent irrigation), and reference to custom represented an ongoing framework for efforts to manage such conflict.⁶⁰

Yet, even here, the problems of applying irrigation customs in a highly unstable context continued. While noting the important political principle involved in recognizing existing custom in such systems, the Punjab lieutenant-governor (reacting to a rodkahi dispute from neighboring Dera Ismail Khan district that had risen all the way to his attention) commented on the nearly impossible conundrums that remained in applying custom systematically in such highly variable water landscapes. “There is not sufficient permanency or sufficient power of control to afford room for the establishment of definite customs,” he wrote of such cases in frustration, “and everything is more or less a scramble.” In the final analysis, the only recourse, he suggested, was for the government simply “to *make* a rule.”⁶¹ For the government to “make” a rule, of course, was to undercut the basic conceptual dichotomies that gave “custom” meaning. The case highlighted once again the dilemmas in the state’s relationship to custom that Lyall had noted in trying to conceptualize the operation of custom in irrigation more generally.

Interestingly, more recent work on the operation of such registers on hill torrents suggests the ongoing complexities in the assessment of the operation of such

“customary” forms of local irrigation control and the meanings of “local community” in such contexts. In Dera Ghazi Khan, the operation of such registers of irrigation customs for hill torrents were ultimately done away with in the “settled” parts of the district while continuing to operate in the “tribal” or nonregulation areas of the district. This provided the framework for a recent study comparing the operation of rodkahi irrigation in these two parts of Dera Ghazi Khan. The study found that, in the tribal areas, the operation of customary forms of irrigation management, guided by *Haquq-i Abpashi*, produced higher overall crop returns in torrent irrigation systems than in those areas under statutory management, most particularly by producing greater equity in returns between upper (saroba) and lower (paina) irrigators. Such studies suggest how all these local arrangements can be analyzed in terms of what social scientists call “design principles” conducive to maximizing cooperation in efficient use of a common-pool resource at the local level.⁶² But, as the comparison between local management in regulation and nonregulation settings suggests, this was a product also—and perhaps even more importantly—of the tensions generated by the attempted grounding of such local arrangements in the larger structure of statecraft embodied in the state’s legal and property regime.

The Chher Labor System

Perhaps the most dramatic example of the difficulties underlying both the practical and conceptual adaptation of custom to canal management lay in the long struggle of the British to adapt their system of administration to the operation of the chher labor system on the inundation canals of southwestern Punjab and Sind. These were among the largest and most important of the indigenous Indus basin canals inherited by the British from the precolonial era, and they continued to be critical to the state’s revenue in these districts. Yet the adaptation of the management of these canals to the structure of British administration and property dramatized the contradictions the British faced in reconciling statute and custom in irrigation law.

The chher system had long been central to Indus basin canal management, since its workings were driven by one of the most critical environmental dynamics of the region: the need for large-scale seasonal labor mobilization to clear silt accumulations from canals as the rivers rose and fell. As worked by Diwan Sawan Mal and by others before the arrival of the British, the chher system was the Indus basin institution *par excellence* that linked labor obligations with the establishment of irrigator water rights. Irrigators themselves provided labor for the critical winter silt clearances without pay (or with minimal pay and subsistence) in return for rights of access to canal water. But, given the state’s role in mobilizing this labor, some officials attacked it early on as contrary to the principles of “public” responsibility that later defined the Canal Act. As we have seen, John Jacob argued that

the use of unpaid labor was contrary to the most basic principles of political economy, and he abolished the system in Sind in the 1850s.⁶³

As Jacob's successors discovered, however, adapting the operation of Sind's inundation canals to principles of statutory canal administration proved problematic on many counts. The abolition of *chher* in Sind undercut long-standing arrangements that had defined the relationship of irrigators to these canals. When the government abolished the *chher* system and required that labor for canal clearances be paid, the complexities in the operation of local labor markets—and in the definition of private property—thus subjected the operation of these canals to continuing and extensive political manipulation. Sind officials came to rely on private contractors to provide canal clearance labor, but many of these contractors themselves used coercive processes to secure it. As J. G. Fife noted in 1871, the attempt in Sind “to substitute free, for statute labour in a thinly populated province” simply forced up the price of labor and led to various expedients to compel tenants to do the work. “Free labour,” he wrote, “though attempted, has really never existed, and the labour is still provided only with the aid of the Zemindars and the Revenue officers.”⁶⁴ Even decades after the *chher* system's abolition, Sind canal management thus bore little relationship to the ideals of political economy that Jacob championed.

It was little surprise, therefore, that many in Punjab questioned the wisdom of the abolition of the *chher* system and instead sought to find a place for it within the structure of colonial canal administration. The conceptual key to doing this, of course, was to link the system to “custom.” In his 1882 memorandum, Lyall rejected the notion that *chher* represented a form of state-mobilized “statute labor.” Instead, he stressed that the fundamental logic of the system lay not in state coercion but in the reciprocal linking of labor obligations and water rights within the framework of local community. Whatever the role of state officers in mobilizing *chher* labor, the system was, in its essence, Lyall declared, “solidly founded on custom, and suits the habits and circumstances of the people concerned.”⁶⁵ It was, he said, “a canal irrigator's co-operative clearance system, and each owner of irrigable land (ie, of land which, accidents excepted, can get water if the owner does his work properly) is by the system bound to do his share in proportion to his holding.”⁶⁶ More important, it was a system rooted in past practice.

Defining the proper relationship between the state and the local community was, once again, the key to assimilating the system to British law and policy. As in the recording of other irrigation “rights” in the *Rivaj-i Abpashi*, the Punjab government attempted to reduce *chher* rules to writing, specifying the role of customary association, on the one hand, and of the coercive authority of the state to enforce such arrangements, on the other. Approaches varied from district to district (in keeping with the British vision of *chher* as an essentially local system). In some districts (such as Muzaffargarh), the organization of the *chher* system was left (at

least initially) to local committees, who were overseen by the district revenue authorities, whereas in other districts (such as Multan), the operation of the *chher* system was brought directly under the oversight of the provincial Irrigation Department. But in each case, the delineation of *chher* rules differed from the simple recording of “custom” in that these rules delineated a system that theoretically linked state oversight with customary practice.

The key institution mediating between the state, as the enforcer of *chher* rules, and the appeal to popular “custom” was the canal panchayat. Canal panchayats had existed in various forms under earlier rulers, but they came to be central to the ways that British officials conceptualized the *chher* system as an essentially customary, if state operated, system. According to the *chher* rules promulgated in Multan in the 1850s, for example, panchayat representatives were selected from circles of villages, marked off “according to their position on the canal,” the numbers of members of the panchayat varying from three to nine depending on the size of the canal. They were, according to the rules, selected by the government but intended to “represent” the interests of irrigators at different positions along the canal. In Muzaffargarh, such “representation” was even more direct. There, members of panchayats on each canal were elected by the *lambardars* of the villages watered by that canal. They were responsible not only for working with government officers on the administration of the *chher* system but also for exercising, in the words of one official, a “general control over the distribution” of water on the canals, looking after their own interests and “the interests of those they represent.”⁶⁷ Such “representatives” were, in the opinion of many officials, critical to adapting the system to the legal structure of British rule. As J. H. Morris had written at the time of the first settlement in Multan in the 1850s: “To secure a successful system of canal management, the services of the community must be enlisted, by the appointment on each canal of a panchayet, all of the members of which will have a direct and personal interest in the efficiency of that canal.”⁶⁸ By engaging these panchayats in the collection and mobilization of *chhers*, the British thus transformed the state’s role from one of mobilizing statute labor to one of enforcing and overseeing community structures of water control that were rooted not in statute but in custom.

The operation of such panchayats within this system nevertheless fit only uneasily into the rubric of “customary” shares and rights. As the “body of irrigators” on most inundation canals was fluid and shifted from year to year, the “community” represented by the canal panchayat was in fact largely delineated by the state itself. Legally speaking, as the settlement officer of Muzaffargarh wrote, “the persons entitled to irrigation cannot be specified, because any person whose land can be reached by water can become an irrigator,” a critical element in an arid world where water supply in many inundation canals varied markedly from season to season.⁶⁹ To define these communities, it was up to officials to record those who received irrigation each year and who were thus responsible for supplying *chhers*

on each canal during the subsequent clearance season.⁷⁰ Though perhaps undergirded by customary cultural norms of reciprocal obligation, the system was one defined at its root less by custom than by annual contract, with the state playing a critical role in legally constituting the irrigating community. Those who took water were obligated (by implicit state-enforced contract) to perform (or provide) labor for the canal's annual maintenance, even as claims to water and responsibilities for chhers shifted, in theory, from year to year.⁷¹ The standing of canal panchayats as "customary" organizations was thus open to significant questioning, as they were quite different from the "natural," genealogically defined communities conceptualized by the British as anterior to state administration.

In such circumstances, the tendency to label such arrangements as "customary" had significant consequences. When the revision of the Muzaffargarh settlement in the late 1870s suggested that canal operation had deteriorated since the arrival of the British, some officials suggested that this was precisely because of the tendency to view the chher system as a largely "customary" system, when in fact it had always depended overwhelmingly on state initiative. By looking to local irrigators to take the initiative in the working of the system, some now charged, local officials had misunderstood the system, with the result that they had ignored their own responsibilities, and irrigation in the district had as a result suffered. "The zamindars are entirely without sufficient combination to carry out the annual clearances or any other large work," the settlement officer declared.⁷² "There are so many confuting interests," wrote another official, "that they cannot combine, and never have combined without State aid."⁷³ Such views dovetailed with the emerging British notion that local "communities," with their essentially genealogical roots, could not be expected to take effective collective action in matters relating to production. Declining levels of irrigation in Muzaffargarh were thus, as one official noted, at least in part a product of the misplaced faith in the "people" to collectively manage such works on their own—a faith that had led to serious misunderstanding.

This was all the more critical, in the eyes of some engineers, because the system had allowed powerful local men to take advantage of the appeal to "custom" simply to secure their own interests at the expense of the general body of irrigators. The very emphasis on "customary" arrangements tended to immobilize engineering efforts to "rationalize" canal administration for the "general good," which was the government's mandate under the Canal Act. Intrinsic to the very idiom of "customary" rights was the claim by powerful men to privileged access to water, to a right to raise seasonal flow by putting dams into channels, or to reductions in their quotas of chhers in return for serving on panchayats. This extended also to the roles of local water-masters, here called mirabs. As one official noted, "customary" management often meant that the mirabs, the local men in charge of dividing the water, were paid by the irrigators directly and so were easily open to the influence of the most powerful men

among the panchayat members. Some state officials complained pointedly at times about this influence, which threatened for them to undermine all pretense of rational administration. Local mirabs often looked the other way when influential zamindars made special cuts in canals to assure themselves of adequate water during low supply, or erected dams or put jhalars in channels to maintain their supply in difficult times.⁷⁴ The influence of powerful local men in monopolizing irrigation on some of these canals was at times borne out by British statistics themselves.⁷⁵ This was particularly unsettling to canal engineers. “That the system, at least as worked under the British administration, leads to oppression on the part of the headmen of villages, and that it is unsatisfactory to the Engineers, whose object is to maintain the canals in an efficient state, are,” one leading engineer thus wrote, “facts not denied by any one who has had experience in the matter.”⁷⁶

The problem, at root, was once again the conceptual separation of the roles of the state and of custom in local irrigation administration. As many officials increasingly argued at the end of the century, reference to the roles of local communities within the *chher* system had simply confused the state’s own role in managing annual silt clearance and maintaining canals in running order, in the process allowing powerful local interests to compromise efforts to extend irrigation and maximize efficiency. Perhaps equally important, once the role of custom in water management had been called into question, then the state’s own use of unpaid *chher* labor in canal clearances came to be legally suspect as well—appearing, just as Jacob had argued a half century earlier, to be nothing but reliance on a form of forced labor. Since the Canal Act expressly forbade this, it was little surprise that, at the turn of the century, Punjab officials responded to years of debate by deciding, finally, to abandon the *chher* system on the canals of southwestern Punjab. At the opening of the twentieth century, it was replaced with a system of cash water rates and hired labor for canal clearance that fell squarely under the Canal Act’s statutory provisions. But even then, this hardly ended (as we shall see in the next chapter) the tensions implicit in the administration of these canals.

WATER LORDS

The tension between statute and custom, which was central to the underlying British understanding of their rule, thus shaped canal administration significantly. It also shaped a critical strand in irrigation development that was to have important political implications in the twentieth century: the development of local “water lords” who were active, transformative agents in canal development (and served like the state as patrons of agricultural expansion) but whose cultural *styles* as water managers nevertheless remained embedded in the idioms of local “tribal” community. In terms of the long-term expansion of irrigated acreage in the region, the role of these local water lords was relatively minor. Their signifi-

cance lay in the fact that they bridged the conceptual legal dichotomies of the colonial system through forms of *personal* assertion that embodied both transformative self-directed action upon nature *and* a cultural style rooted in the realms of “tribal” and natural community. To point to the ongoing interconnectedness of these realms in the actions of water lords is in some ways simply to highlight the persistence in the Indus basin of longstanding, popular visions of relationships to nature that defied the conceptual dichotomies shaping the administration of the colonial state. But the history of these water lords is hardly separable from the history of these dichotomies as they were embodied in colonial administration, for it was in relationship to structures of British statecraft that the influence of water lords developed. Indeed, their history provides a critical counterpoint to ongoing attempts to separate statute and custom, and one with important long-term implications for the evolution of Indus basin water politics.

Captain Grey and the Patriarchal Style

The cultural space for these “water lords” emerged from the cultural fissures of the colonial regime itself. Powerful images of patriarchal water control had shaped policy in the early years of colonial Indus basin irrigation expansion (as we saw in chapter 2), images projected not only by (and upon) Baloch chiefs but also asserted by some British leaders themselves (such as Robert Sandeman). But such visions had waned as the British made space for a fully rationalizing, state-directed system of water control (embodied in the Canal Act), a system made possible by conceptually projecting “tribal” influence into the separate and distinct (and formally nonproductive) realm of “custom.” Still, the deep tensions that marked the colonial regime as it sought to patronize *both* of these realms opened the doors to leaders who sought to make use of old models of patriarchal water control to mobilize popular participation in irrigation development—even as a new structure of water law was developing.

No leader among the British more clearly exemplified this trend than Captain L. J. H. Grey, who had first gained notoriety on the trans-Indus frontier when he was kidnapped as part of a tribal feud in Dera Ismail Khan district in the 1860s and rescued by none other than Sandeman himself, an event that was popularized at the time in a local Siraiiki ballad.⁷⁷ But Grey’s role in canal building in Punjab was also shaped profoundly by his service in Bahawalpur state. There he had worked closely with the (British) state engineer to develop an approach to irrigation focused on the fusing of technical engineering knowledge with a personalized style of leadership that could mobilize popular participation in the building of new irrigation works by linking them to indigenous “tribal,” patriarchal values. When he was transferred to Ferozepore as deputy commissioner in the early 1870s, he began to experiment with a style of irrigation expansion that initially defied the conceptual separations shaping emerging British water administration.

Ferozepore in the mid-nineteenth century was a district that resembled in some respects the arid reaches of the west and in some respects central Punjab. Parts of the district were already known for their well-based agriculture and strong village communities, but the district had historically been famous also for its grazing grounds and its cattle. By the 1870s, the cultivated area constituted only a little more than 50 percent of the district, the cultivation significantly constrained by the availability of water. Rainfall at Ferozepore town averaged slightly over seventeen inches per annum, decreasing rapidly (at a rate of almost one inch every ten miles) as one moved south and west.⁷⁸ While touring the district after he became deputy commissioner in the early 1870s, Grey estimated that “much more than a lakh of acres in this district yielded little or nothing for want of irrigation.”⁷⁹ Shortly thereafter, he launched a program of local canal building under his own personal direction.

As Grey undertook this, he projected two distinct sides to his leadership. The first was rooted in a claim to personal, technical knowledge, mobilized independently of the irrigation bureaucracy. For this, he drew primarily on his own technical and administrative experience gained in Bahawalpur state. “I brought my [engineering] knowledge from [Bahawalpur],” he wrote, “learnt from the State engineer”⁸⁰ Grey laid this out in a *Manual of Construction and Management of District Canals*, which he published in 1885. As he emphasized there, a deputy commissioner who would undertake such local canal construction had to bring engineering knowledge to bear to personally oversee “*everything*.” He had to “select the lines, give the designs on the surveys, check the calculations, lay out the work, arrange its distribution, supervise its performance.”⁸¹ But Grey added to this an additional form of knowledge: *local* knowledge. In order to draw local communities into canal construction, he mobilized the distinctive regional techniques of canal construction he had learned in Bahawalpur, in particular the dakh (or *dak*) system of assigned sections, with each canal section excavated by those who had a local interest in that section. Grey’s aim was to adapt this system to contemporary Ferozepore, where many participating villages—and their proprietary “village communities” and large, potentially cultivable village “wastes”—were in process of assimilation into the mapped British revenue structure.

Equally important, however, was a second side to Grey’s leadership, a *cultural* style rooted in an appeal to patriarchal idioms and to the forms of exchange and honor associated with them. This allowed Grey to seek to mobilize the “village communities” assigned to each dakh as *collectivities*, through their leadership. For evidence of this, we can turn to a second document, a Punjabi praise poem entitled “Thanksgiving for the Ferozepore Canals,” which was written by a Ferozepore lambardar and presented to Grey as an offering as his canal construction project in Ferozepore neared completion. The poem can hardly be taken as a fully independent commentary on the process of canal construction, for it was undoubtedly writ-

ten in significant part to please Grey and the British.⁸² But it mobilized a language of engagement in water control far different from that embodied in Grey's canal *Manual*. Indeed, the authority of the successful canal builder was here rooted less in the control of scientific expertise than in a direct, intuitive engagement with nature, much in the manner of a tribal chief or Sufi saint. Touring the district as the new deputy commissioner, Grey drew his inspiration, in the poet's imagining, not just from a scientific understanding *of* but from a very personal dialogue *with* nature: "From lack of water, I am lying absolutely desolate," a dry channel told him. "People call me *rakar*, *banjar*, and *shor*," the dessicated wasteland added, and it pinpointed the problem: the set of the Sutlej lay too low to provide water. "Have no hope of Khizr," the river declared; "I have left you." But to this Grey responded: "I am planning, despair not." And having thoroughly surveyed the country, he began work on his canals, his leadership galvanizing the people in bringing the river to heel. "I will take the canals from the Sutlej," Grey is made to assert, "and populate the country."⁸³

Grey drew local leaders into his project not just through the mobilization of rational interests, nor by appealing to past "custom," but through a style of leadership that transcended both. As the lambardar-poet declared, "Without the aid of the rulers, water cannot be had. Self-willed men can do nothing and know nothing." Rather, he implied, it took a patriarchal leader of Grey's type to succeed, and he underscored this by describing how Grey bound local communities to the project in part through ritualized exchanges that allowed local village leaders to share in his leadership style. He invited these leaders to local darbars, distributing garments—"khes, shawls, *lungis* and *chogas*"—as honors and rewards, cementing their participation in what was simultaneously a material and cultural project: "The Sahib was a ruler, full of devices and influence," the poet wrote. "He controlled the river and turned it into the canals. Within two months, the work was finished. Like a hundred Alexanders was his name."⁸⁴

In practice, of course, Grey's style hardly reconciled entirely the technical demands of canal building with local "community" participation, for as he soon recognized himself, Ferozepore society was honeycombed with competing interests, both within and between villages.⁸⁵ This was particularly the case in areas where agricultural and grazing interests competed. Grey's *Manual* thus called for the eventual appointment of local supra-village officers, including a superintendent of canals and local *mohtamims* (overseers) and mirabs, to supervise the distribution of water between villages on each of Grey's new canals, and to deal with disputes. He also sought to bind local leaders to written agreements on the bounding of irrigable areas that were included in local, customary records of rights (or *wajib-ul-arz*).⁸⁶ But all of this was overlain by his active personal supervision and direction.

Nevertheless, as subsequent events were to show, such conflicting interests inevitably boiled to the surface and opened Grey's procedures to the critique of

higher civil and irrigation officials. Such tensions erupted in a direct conflict between Grey and the lieutenant-governor of the Punjab in 1875–76. Receiving complaints from some village leaders about Grey's policies, Lieutenant-Governor R. H. Davies left the capital in Lahore and crossed the Sutlej in 1876 to investigate personally. What he found, in Grey's own words, was "five long miles" of "waving arms and cries of *Dahai*, help." Most critical for provincial officials were the ways that the operation of Grey's canals had intersected with other government policies and structures, particularly with monetary relations between landlords and tenants, in the process galvanizing protests. Grey had explicitly attempted to separate canal management from such monetary matters: "As far as possible," he wrote in his *Manual*, "all money transactions with the irrigators should be avoided. . . . It is for them to do the work themselves, or to get it done on payment, but on no account should the officials have anything to say to the latter, which the irrigators should be left to arrange for themselves."⁸⁷ Influence and incentives, he hoped, would flow through "community" networks.

But not surprisingly, it proved in practice impossible to separate Grey's irrigation arrangements from the larger conflicts inherent in British revenue and tenancy policies.⁸⁸ And Grey's canals were caught up in ongoing engineering conflicts as well.⁸⁹ For some engineers, Grey's canals became a case study of the ways that community involvement—and a lack of adequate bureaucratic and technical control—led almost inevitably to inefficiencies and to lack of proper attention to the concerns about water wastage that marked the Canal Act. As his supporters made clear, Grey's intention had been that procedures for distribution of water would become more rigorous as time went on. He had initially been willing, as one official put it, "to tolerate the cultivators taking water by imperfect methods . . . until they had thoroughly convinced themselves of its value, but he desired that in time the use of fixed heads for water-courses and their due clearance and maintenance should be insisted on."⁹⁰ However, in the eyes of some engineers, his very focus on village responsibilities had led to inefficient management, with some villages getting excess water and others not enough.⁹¹

For critics, all of this seemed to call into question the very foundations of Grey's approach. But Grey's canals nevertheless came gradually to encompass a significant part of the district's arid lands. As the Ferozepore gazetteer summed it up in 1915, the "Grey canals" had by that time come to comprise almost 1,000 miles of main channels and branches, with a command area of over 400,000 acres.⁹² This was a significant, if still localized, accomplishment. Yet this very success increased pressure to assimilate the Grey canals to broader frames of irrigation management. In the early decades of the twentieth century, they were gradually assimilated to bureaucratic structures of management, with irrigator input confined increasingly to the paying of a fixed water rate. By the 1910s, little of Grey's system of village responsibility remained.

Still, in spite of these developments, there can be little doubt that Grey's efforts had, at least initially, struck a strongly responsive chord among many British officials, and precisely because his leadership had seemed to reconcile the dilemmas in harmonizing state and popular (or "customary") water control. As Lieutenant-Governor Sir Charles Aitchison put it in commenting on the printing of Grey's canal *Manual* in 1885, Grey had, by mobilizing village communities in the canal-building process, shown "what may be done . . . by energy and sympathy with the people." This did not lessen the need for technical, bureaucratic oversight of such canals, as Aitchison made clear in his comments. But Grey's model nevertheless pointed to the legitimizing importance for the British of appearing to engage with the "people" even as they developed increasingly bureaucratized frames of management under the Canal Act. Officials, the lieutenant-governor said, should "carefully consider the feasibility of the creation of such works, and use their best efforts to induce the villagers to combine for their execution."⁹³ If the practical contradictions in applying such a model were many, Grey's efforts suggested the potential attraction of such a model for the British, precisely because such an approach seemingly sidestepped the larger conundrums in reconciling statute and custom in water management.

The continuing place of such patriarchal approaches to water control in British thinking was demonstrated even more clearly in the stories of the indigenous "water lords" who continued to play roles in canal development under the colonial system. The histories of their canals, like Grey's canals, were separated from the main legal lines of colonial water development, and their stories also were marked by considerable controversy. Yet their histories—even more than the history of Grey's canals—highlight the overarching assumptions of colonial water law and the tensions to which the system gave rise. Two of these histories—those of the Khakwanis and the Tiwanas—point to the local dynamics that continued to shape the larger water law regime.

The Khakwanis in Multan

Perhaps the greatest exemplar of the nineteenth-century water lords was Ghulam Mustafa Khan Khakwani of Multan. He was the son of a Pathan governor under Nawab Muzaffar Khan, who had ruled much of southwestern Punjab from Multan city in the early nineteenth century. Even before the arrival of the British, his family had gained a reputation for inundation canal management and for bringing "large waste tracts" into cultivation, particularly during the time of Diwan Sawan Mal.⁹⁴ Herbert Edwardes recounts how Ghulam Mustafa Khan, a man known for his skill in turning "barren tracts of jungle into cultivation," came to play a central role in 1831 in excavating for Diwan Sawan Mal a canal called the Diwanwah, one of the most important inundation canals on the right bank of the Sutlej built during that era. When the British arrived, they thus found in Ghulam Mustafa Khan

not only a man of considerable technical knowledge of irrigation but also a man with strong connections among merchants and officials in Multan city and a reputation as a hard-headed, patriarchal leader among the “tribal chiefs” of the Mailsi *bar*.⁹⁵ Here was someone who seemed to capture the requirements for a state proxy in canal building and for customary “tribal” leadership simultaneously.

The British thus sought to mobilize the talents of Ghulam Mustafa Khan early on as a canal builder to help them extend control over and settle pastoralists in the large arid *bar* in the interior of the district. This began with the lease to the khan of the rights to collect revenue from temporary cultivation in a huge area of Mailsi *bar*.⁹⁶ In 1861, with the sanction of the British government, Ghulam Mustafa Khan began construction of a sizable canal, the Hajiwah, which, when completed after his death by his son, Ghulam Kadir Khan, was thirty to forty feet wide, more than ten feet deep, and ultimately ran fifty miles from its head on the Sutlej river in Montgomery district into the *bar* lands of his lease in Multan district. In some ways, Ghulam Kadir Khan’s relationship to the British was like that of other land controllers to whom the British offered property rights in exchange for opening arid wastelands to agriculture, and, indeed, he developed a reputation for breaking pastoralists “into habits of order” on his lease.⁹⁷ He was rewarded in 1879 with a grant of 60,000 acres of this irrigated *bar* land in proprietary right (see map 5).⁹⁸ But his canal involved not just the opening of his own lands but also the supply of water to other mauzas in the region. He had become, in fact, a “water lord.”

Ghulam Kadir Khan’s success in assimilating an important part of the Mailsi *bar* to the larger British revenue structure was evident on British settlement maps, which soon showed a new group of eight mauzas in Mailsi tahsil (composing the “Hajiwah grant”) now labeled simply “Pathan.”⁹⁹ But, as a “water lord,” Ghulam Kadir Khan brought a personal “tribal” style to water *management* as well, which linked his control over irrigation to the active *political* manipulation of local lineage organization (a vision of “customary” authority quite different from that embodied by the state’s recording of customary “rights”). In settling the area, Ghulam Kadir Khan turned to many of his Pathan lineage cohorts to finance and construct the many *kassis*, or minor distributaries and watercourses, taking off from the main Hajiwah canal, that were vital to the process of opening the land.¹⁰⁰ In managing the distribution of water to these *kassis*, he made use of all the common tools of dependency and loyalty, rewards and punishments that characterized lineage leadership generally, linking lineage obligations (and control) to the management of what was now the area’s most critical productive resource. Nowhere was this clearer than in his approach to water charges. As one British observer noted, Ghulam Kadir Khan defined rates for water that differed “considerably on different parts of the estate, the Khan being influenced by the relationship of some of the irrigators or by other considerations.” Such differential treatment of the irrigators, on the basis of lineage relationships and other personal ties, was central to the

khan's personal influence as a lineage leader.¹⁰¹ And, it suggested how recognition of Ghulam Kadir Khan's position as a water lord allowed for the local operation of forms of water administration that fused what had been conceptually separated in colonial water law—that is, matters relating to production and those relating to kin-based community.

For the British, however, this also defined a difficult contradiction. On the one hand, it suggested precisely the attraction for the British in mobilizing indigenous agency—and patriarchal idioms of leadership—to galvanize local participation in irrigation development. Whatever the conceptual dichotomies shaping the colonial legal regime, at the local level the *interconnections* between productive investment and lineage organization continued to define local life. And making space for “water lords” made space for these interconnections as well. On the other hand, it also made manifest how the dynamics of local lineage organization could not only facilitate but also disrupt, larger water delivery arrangements—and with potentially critical consequences for the developing stability of the colonial property regime and for the “public” authority of the state. Nowhere was this clearer than in the susceptibility of lineage relations to the disruptive impact of inheritance disputes. Aware of this potential, the British had insisted in 1886, while lauding Ghulam Kadir Khan's role in opening the *bar* to settlement, that he also sign a written deed for the Hajiwah that recognized the state's right to take over the canal and guarantee the delivery of water to individual water users in the event of any disruption in locally managed water delivery.¹⁰² With the khan's death in 1888, British insistence on this deed seemed prescient.

Primary responsibility for the canal was initially assumed by Ahmad Yar Khan Khakwani, Ghulam Kadir's second son, who had shown himself the most able and assertive of the sons in water management matters. But, almost immediately, the government began to receive petitions from Ahmad Yar Khan's three brothers (and the other interested parties and relatives who supported them) complaining about the operation of the canal. The eldest son, who had received a large block of land at the tail of the canal, now complained loudly to the government that his land was being short-changed by his brother's water management. Using language calculated to activate British political concerns, he appealed to the government to exercise its authority under the 1886 deed. “Thousands of tenants and others who are located in the villages irrigated by this canal will be ruined,” he declared, and they will desert. Nothing, of course, was more calculated to alarm the British than this hint of pastoral backsliding, and the deputy commissioner responded quickly: “[T]he interests of all the tenants and other private rights which have grown up must be protected.”¹⁰³ Only public state control of water, he implied, could in such circumstances protect the establishment of bounded property rights.

In late 1888, the government thus moved quickly, in accordance with the terms of the 1886 deed, to take over direct management and operation of the canal. What-

ever the Khakwanis' continuing claims to ownership of the canal, the government acted in the name of what they saw as their most critical interest, the protection of landed property, which required "public" control of the water supply. This was the logic of the Canal Act. But the three younger sons, led by Ahmad Yar Khan, now objected strongly—and in terms that suggested the competing visions of water law and political legitimacy embodied in colonial statecraft itself. Although the government might in a crisis take over management to protect supply, they contended, it had no standing to infringe on the Khakwanis' own proprietary right in the canal itself, for this was bound up, they argued, with their "tribal" honor. As Ahmad Yar Khan declared in a memorial to government, his patriarchal honor as leader of the Khakwanis could not be separated from his interest in the canal. Even if the government undertook management, he wrote, it had no right to interfere "with your memorialists' relatives, their tenants, or with the arrangement they may make from time to time with others who may require water for irrigation." What a cruel disappointment, he now declared, in a statement loaded with the language of honor (which was projected here as a cultural bond between the government and the people), that "an undertaking which they regarded as a success which would bind their family in loyalty for ever to the British Government, and be a source of honor and gain to them, is likely to involve them in trouble and entail on them loss and disgrace."¹⁰⁴

Such language exposed, of course, the contradictory elements in the structuring of the government's own policies and its visions of authority, particularly when it came to such water matters. And the Khakwanis, clearly recognizing these contradictions, pressed their case energetically with a suit in 1892 against the secretary of state for India, asking for the restoration of their proprietary rights in the Hajiwah canal. They based their claims primarily on the promises that had been made to their grandfather by the British in initially encouraging him to undertake the canal. But they underscored also the numerous undertakings made by the British as they had mobilized the Khakwanis as canal-building proxies precisely to balance technical skills in local water management with skills in customary "tribal" relations. As one Muslim witness in the case (a *lambardar*) declared, control over the use of the water and over the canal as a physical structure belonged to those whose enterprise had built it, and in this case it was not the government that had done this, but the Khakwanis. "The water belongs to the river, and the river is the property of God," he declared. But "I call the Khan's family proprietors of the canal bed and bank" because, having built the canal, "they have power over the water to give or not."¹⁰⁵ In this there were echoes of Islamic law as well as an appeal to the power that the British themselves had delegated as they had sought to adapt their own "public" authority to the principles of natural community and local kinship organization. As another witness declared: "The excavator of the canal is owner as long as the canal is working" a principle that even the British themselves, he

declared, had previously recognized.¹⁰⁶ For the British to seize the canal thus represented not only a grave injustice but also a violation of “customary” norms that the British claimed to respect.

In the eyes of the lower courts and the Chief Court of Punjab, however, none of this was adequate to outweigh the specific legal terms of the canal deed of 1886, which Ghulam Kadir Khan had, after all, freely signed. The Khakwanis’ enterprise had been more than amply rewarded, they ruled, by the proprietary grant of the Khakwanis’ 60,000-acre landed estate. But, in a stunning reversal, the law lords of the Privy Council in London in 1901 took a different view. Although the government had every right to take over and operate the canal in the “public” interest in accord with the 1886 deed (and, one might add, in accord with the larger principles of the Canal Act), this could not extinguish the Khakwanis’ proprietary ownership of the canal (if not of the water that flowed in it). “Bearing in mind,” the law lords declared, that the government had encouraged Ghulam Mustafa Khan to build the canal both because they saw the Khakwanis as better able to mobilize local resources in canal building than themselves and because the government thought it best “to leave the settlement of the country in the hands of Native Chiefs,” it was “pretty clear that the Government must have intended the Khans to understand . . . that all Government land required for the canal would be made over to them in proprietary right.”¹⁰⁷ Though focusing only on the “bed and banks” of the canal (and thus leaving government’s technical claim to ownership of all irrigation water intact), the decision nevertheless captured clearly the larger political framework in which the recognition of the Khakwanis as water lords had first occurred. At the same time, as a stinging legal challenge to the government, the decision underscored the ongoing contradictions in the structure of water law represented by the appeal to “public” principles of water control, on the one hand, and the appeal to “custom,” on the other.¹⁰⁸

The Tiwanas of Shahpur

The history of the Tiwana maliks of Shahpur provides an even clearer illustration of how British water policy intersected with local politics, even as local leaders sought to negotiate the competing claims of statute and custom. The Tiwanas were, as Sir Denzil Ibbetson put it, originally “half pastoral, half agricultural” in their pursuits.¹⁰⁹ In the seventeenth and eighteenth centuries, they had occupied lands on the fringes of the Thal desert in the Sind Sagar doab, west of the Jhelum river. Having established a number of fortified villages (Ukhli Mohla, Mitha Tiwana, Nurpur Tiwana, Hamoka, Hadali) on the edge of the Thal, they had long patronized some agriculture but gained prominence primarily for their military prowess as horsemen, developed over a long period of local fighting in competition with other tribes (such as the nearby Salt Range Awans) and among themselves. It was during the period of Sikh rule that they first became deeply involved

in state politics, initially resisting Sikh power and then serving the Sikhs militarily. Like the Khakwanis in Multan, they switched their allegiance to the British at a critical moment and adapted readily to the British administration as both soldiers and land controllers—indeed, it was probably Tiwanas whom we saw at the end of the last chapter attempting to manipulate the Shahpur settlement officer with small patches of cultivation to lay claim to large grazing grounds.¹¹⁰

It is hardly surprising, in these circumstances, that the British eventually turned to them as agents for facilitating the extension of British proprietary control over the uncultivated or semi-cultivated “wastes” of Shahpur district—and that the Tiwanas readily responded. Though at annexation the wastelands of the *bar* extended in some areas almost up to the Jhelum river, the British found evidence in Shahpur of a number of earlier canals, now silted and moribund, that required only local “enterprise” to be reopened.¹¹¹ In the early 1860s, the deputy commissioner of Shahpur began to encourage nearby families to undertake canal rehabilitation and construction (as had the deputy commissioner in Dera Ghazi Khan along the trans-Indus frontier at roughly the same time, as we saw in chapter 2) and even spearheaded the reexcavation of one canal himself. It was the Tiwanas, however, who took the lead in this process—and ultimately with stunning results.

Malik Sahib Khan Tiwana of Mitha Tiwana, who stood out among the Tiwanas for the military support he had given the British in 1857, was the first to succeed in such canal building—and in a spectacular manner. Granted a substantial wasteland lease (ca. 9,000 acres at Kalra in Shahpur tahsil), he constructed a canal from the Jhelum to bring this land under cultivation and was subsequently rewarded with the grant of this land in proprietary right.¹¹² Equally important, with a key inundation canal under his control, he emerged, at a stroke, as the most influential of the Tiwana maliks. This provided the impetus for other Tiwanas (and other local notables as well, including leading Noons, who intermarried with the Tiwanas) to apply for wasteland leases of their own and to begin building canals in order to open cultivation on what had previously been intermittently cultivated grazing lands. Many of the leading Tiwana and Noon maliks soon transformed these leases into profitable proprietary estates.¹¹³ With “the success of Sahib Khan’s canal,” wrote S. S. Thorburn some years later, “the left bank of the Jhelum in Shahpur became a veritable ‘El Dorado’” for would-be water lords.¹¹⁴

As the British had hoped, the establishment of these estates simultaneously stabilized lineage authority among the Tiwanas and tied the structure of such “tribal” leadership firmly to the property order of the British state in the locality. Water control was the key to the emergence under the British of a structure of lineage leadership among the Tiwanas linked to the control of large estates. With the opening of new inundation canals, three leading Tiwana canal builders solidified their positions as leaders of three dominant Tiwana lineages, each tracing its history to a different fortified ancestral village west of the Jhelum (Mitha Tiwana, Hamoka,

and Hadali) but each now tied to a profitable canal irrigated estate east of the river (Kalra, Khwajabad, and Jahanabad) (see map 6).¹¹⁵ As in the case of the Khakwanis, the success of the Tiwanas in canal building cemented for the British a strong connection between proprietary landholding and “tribal” lineage leadership.

Yet, as in the case of the Khakwanis, Tiwana canal-building was marked by the tensions that defined British water policy generally. Even more than in the Khakwani case, the Tiwanas used their new canals not only to carry water to their own leases and estates but also to supply water to nearby Shahpur villages, thus enabling the expansion of cultivation on the sizable village grazing wastes (“commons”) that existed in the region. This was, of course, entirely in keeping with British visions of the spread of agriculture in western Punjab, for it led to the expansion of cultivation within the framework of preexisting mauza boundaries, even as water lords became, in effect, proxies for the state. The Tiwanas became important providers of water all along the Jhelum, supplying water to villages at a rate known locally as *chaharmi* (whose incidence varied, but which was commonly, as the name implies, one-fourth of the produce on canal-irrigated land). The importance of this was indicated by the acreage figures of lands irrigated from the canals of these water lords: in 1914, out of a total of about 26,000 acres irrigated by the canals of the three leading Tiwana lineage leaders, almost 10,500 were in nearby villages paying at *chaharmi* rates.¹¹⁶

Yet even though many officials welcomed this process, they also found it in some respects troubling that, in matters of water delivery to other villagers, “tribal” exemplars such as the Tiwanas operated in ways that seemed to challenge the vision of “public” state authority embodied in the Canal Act. Indeed, the terms of the act explicitly forbade the private selling of water. But, perhaps equally telling, Tiwana water management seemed to challenge British conceptions of *customary* principles of water management as well. Nothing illustrated this more clearly than their attitudes toward the old *chher* system. While the British continued to try to operate this system on government-run inundation canals in Shahpur, the Tiwanas instead generally hired seasonally migrant Pathans from the hills (*pawindahs*) to do the winter canal silt clearance work, and paid them in cash. Ironically, even as the British themselves were debating the customary foundations of the *chher* system, the Tiwanas were using wage labor and, in so doing, guaranteeing the early opening of their canals as the rivers rose in the spring, whereas British officials struggled with *chher* labor to open their canals at what were usually much later dates.¹¹⁷ If this were not troubling enough to some officials, most Tiwana canal controllers used their control over paid labor to make sure that water deliveries to their own lands received priority over other water users, particularly at the beginning and end of the irrigating season when supplies were particularly uncertain and yet often critical to cash-cropping. “It is not till the canal owners’ fields have drunk their fill,” one official wrote, “that anything is available for outsiders.”¹¹⁸ For

some British officials, the leverage over water gained by these water lords thus represented nothing less than “an inversion of rights”—and one that had the potential to destabilize revenue and undermine the village property system.¹¹⁹ It seemed to call into question not only the “public” role of the Tiwanas as proxies for state authority but also the relationship of their approaches to water management to what the British saw as “custom.”

None of this is to suggest, of course, that the British discounted the critical *political* importance of the Tiwanas’ roles in entrenching both agriculture and British influence in Shahpur. To the contrary, most officials saw the expansion of irrigation under Tiwana auspices in Shahpur as key to grounding the colonial village system in an arid environment. A good example of the weight that the British attached to Tiwana water control in encouraging the opening of village wastes comes from the village of Mangowal Khurd, which lay near the path of Malik Jahan Khan Tiwana’s canal in Shahpur tahsil east of the Jhelum. As in the case of many villages in the region, the British had attached at settlement large quantities of grazing waste to Mangowal Khurd, more than half of whose 5,300 acres of land were thus recorded at settlement as uncultivated commons. Much of this was used for grazing, and one faction of villagers, led by a group of cattle-keeping weavers living in a small hamlet situated in the commons, had obtained a court decree in 1884 blocking the partition of the waste for agriculture, based on the recording of preexisting grazing rights in the village *wajib-ul-arz*. But when Malik Jahan Khan Tiwana appealed in the 1890s to the deputy commissioner of Shahpur, James Wilson, to help in overturning this decision so that the villagers would be free to extend cultivation into the commons and to purchase his canal water, Wilson was only too happy to comply.¹²⁰ The general thinking of the British administration was summed up in a memorandum of the government advocate, written after Wilson’s intervention, arguing for the reversal of the Punjab Chief Court’s earlier decision. It is “wholly contrary to public policy,” he wrote, “to interfere for the sake of a trifling customary right with the principal and natural use of the land,” that is, agriculture.¹²¹ Whatever the tensions generated by the role of “custom” in Shahpur villages—and by the commercial attitudes of the Tiwanas—the position of these “water lords” as agents for an expanding agricultural property system was one that, in a case such as this, British officials fully conflated with the state’s public identity and interests. Indeed, the common vision of the Tiwanas as embodying a “tribal” ethos facilitated their brushing aside “customary” interests in this case in the interest of agricultural expansion.

But the position of these water lords in relationship to the customary constitution of Punjab’s villages—and thus to the structure of the British property order itself—was nevertheless a subject of ongoing debate for the British, as other cases relating to the provision of water in Shahpur illustrated clearly. This was evident, for example, in the case of another Tiwana canal on the west bank of the Jhelum built by Malik Sher Muhammad Khan Tiwana (one of the senior Mitha Tiwana

maliks) in the 1870s. Having excavated a canal to irrigate 1,500 acres of his own leased government rakh land in 1872, Sher Muhammad Khan subsequently decided to extend the canal into a state-owned pastoral tract (rakh Khushab) that abutted the village wastes of many nearby villages and provided grazing for large numbers of cattle. His aim was in part to gain access to more land at the expense of his local rivals, in part to profit by selling water to nearby villages for use on their own common land, and in part, as the commissioner put it, to acquire “a name” for himself “and [leave] a memorial on the land,” enhancing his “tribal” honor and place among the Tiwana maliks through the construction of a new canal.¹²²

As in Mangowal Khurd, however, this Tiwana enterprise precipitated bitter internal village conflict. In one largely Awan village adjoining the tract, six of the eight pattis, or genealogical divisions in the village, applied to the deputy commissioner to partition their own village commons in order to take advantage of the water from Sher Muhammad Khan’s new canal, while two pattis strongly challenged this move, seeing in partition the loss of their own access to grazing. In the face of village-level division, the deputy commissioner initially refused to sanction the partition and attacked the actions of Sher Muhammad Khan as divisive, disrupting the balance between cultivation and grazing, and causing “strife and heartburning” in the villages. Indeed, the commissioner now referred to Sher Muhammad Khan as “a harsh landlord, grasping and factious in character,” suggesting, once again, the tensions in British images of these water lords as they sought to combine in themselves the imperatives of supposedly public spirited water supply and patriarchal, “tribal” leadership. Yet even then, as the financial commissioner noted, if Sher Muhammad Khan had made water available to extend agriculture, it would be difficult in law for the British to deny the request of the majority of the village for the shamilat’s partition to take advantage of it.

As the comments of many officials on this case suggested, the role of a water lord such as Sher Muhammad Khan Tiwana was viewed in these circumstances with deep unease, reflecting the contradictions in British policy.¹²³ In succeeding years, some officials used such observations to critique the role of these water lords more generally. As the financial commissioner, Lieutenant-Colonel E. G. Wace, argued in a stinging attack on the practices of the Tiwanas and Noons in the mid-1880s, such water lords were, in effect, “middlemen,” whose management of water supplies served ultimately neither the interests of the state nor those of local communities. They were, in this respect, much like earlier revenue farmers, he said, whom the British had worked hard to eliminate from the structure of the revenue system as men whose presence contradicted the development of “public” responsibility and who fit neither into the realm of statute nor into that of custom. “In giving to private persons who are not owners of the land irrigated the authority to control and distribute irrigation supplies,” Wace declared, “we have assigned to them what by the ancient and still acknowledged custom of the country is a State right.”¹²⁴

Though others were not willing to go so far as this, particularly as the Tiwanas, with their strong military traditions, were widely viewed as critical, loyal props of the British regime in the Punjab, many were sympathetic to the general direction of this critique. Such criticism led Aitchison, the lieutenant-governor, in 1885 to propose a new set of government policies for dealing with so-called “private canals”—policies that made the government’s ultimate ownership of all canal water clear. The very attempt to now label them as “private” suggested the problem, for the British clearly expected these “customary” leaders to also play a “public” role, channeling water that still belonged to the state. “The right of Government in the water should be clearly and decidedly set forth in every case,” he declared, and “for this purpose a royalty, as distinguished from water-rates and revenue assessments, should be taken on every private canal, old or new,” including those of the Tiwanas.¹²⁵ This would in no way abrogate the rights that these water lords had already acquired in their canals, as royalty rates could be easily adapted to suit the government’s and the canal owners’ political needs. But the state’s overriding interest as the ultimate owner of water, particularly as the key to enabling stable production and thus defining rights in landed property, would be affirmed.

The fundamental state interest involved was suggested by Aitchison’s detailing the areas in which the state ought to have the right to intervene in the running of such “private canals.” This was particularly the case in areas related to the protection of private property, such as with respect to excessive and unreasonable water charges or “to prevent the arbitrary withdrawal of supplies once given.” When necessary, the government should also have the power, he declared, to take over the management of canals to mitigate such problems in the “public” interest. (Indeed, this declaration immediately preceded the Khakwanis’ 1886 Hajiwah deed that contained just such as clause.)¹²⁶ As most British officials clearly realized, landed property without water was meaningless in an arid region. At the heart of all these proposals was a concern to limit the degree to which water lords, through control of this basic necessity of production, could insert themselves into the nexus between the state and the individual that defined individual proprietary right—and that defined the common interest of the state and the larger community of irrigators in turning nature to beneficial, productive purposes.

But if such attitudes reflected a strong concern with the relationship between water and the property order, they hardly answered entirely the larger dilemmas that the influence of these water lords raised. At the heart of the issue were the political implications of the relationship between the claims (and meanings) of “custom” and the state’s statutory authority. Even in the face of these criticisms and the strictures of the lieutenant-governor, many officials continued to see the Tiwanas as embodying the fusion of “tribal” identity and productive investment that defined the two sides of the colonial property system. There was indeed an aura of customary legit-

imacy that, for many officials, continued to cloak the positions of these men as water controllers, an aura that defined not just the Tiwanas and Noons but also other prominent water lords of the late nineteenth century (such as the Khakwanis, the Daultanas of Multan, the Mamdots of Ferozepore, and the Legharis of Dera Ghazi Khan) as imagined representatives of a popular “customary” voice critical to legitimizing the colonial order. Such an aura could disappear quickly, of course, at least in British eyes, if a water lord had the temerity to sue the secretary of state for India (as had Ahmad Yar Khan Khakwani). But, so long as the British property order depended on the state’s simultaneous interest in productive, property-owning individuals and in a society structured and stabilized by ancestral, customarily defined communities, men such as the Tiwanas occupied an extraordinarily strategic place in the larger political system. They embodied, in effect, the fusion of proprietary interest (rooted in revenue and agricultural productivity) and collective “tribal” social identity (rooted in the protection of patriarchy) that defined the rural colonial order.¹²⁷ Indeed, their roles as “water lords” defined their emergence in the twentieth century as the core of western Punjab’s landed elite, who gained increasing political significance even within the context of a property order ideologically grounded on the primacy of the local biradari-based “community” (as we shall see).

When it came to the technical management and delivery of irrigation water, however, the roles of the Tiwanas and other water lords remained, not surprisingly, ambiguous. Indeed, their prominent positions in the decades after the passage of the Canal Act were in some ways diagnostic of the tensions in the entire colonial legal order and its relationship to the “management” of nature. Control over water represented a form of control over the natural environment and over those dependent on it that had historically been linked to both state and local chiefly authority. In turning to “tribal” leaders to act as agents in canal building and settlement, the British recognized this and sought to meld the imperatives of customary, “natural” community, on the one hand, and state authority based on rationalizing structures of productive “efficiency,” on the other, within the special, personal authority of a class of water lords. Yet, as we have seen, many officials chafed at the intrusion of “tribal” authority into the management of water, even as they themselves had encouraged it. Central to the tensions underlying the roles of these water lords were thus the deeper tensions marking the conceptual structure of the “modern” colonial state itself as it sought to patronize both customary forms of local control and rationalized water administration, even as the law maintained a critical conceptual distinction—indeed, opposition—between them. The management of water by these water lords opens a critical window not only on the colonial legal structure but also on the nature of water control and water politics at the local level, which often seemed to conform to the expectations of neither rationalized water control nor of custom.

CONCLUSION

Within the larger assumption of state control over water defined by the 1873 Canal Act, the British had thus encouraged a range of expedients to capture the input of local communities into irrigation management. Yet, whether it involved the recording of customary water rights or encouraging the authority of proxy water lords, all these expedients had produced tensions, most of them rooted precisely in the effort to conceptually separate a rationalized, statutory realm from a customary realm associated with “natural” community. Even within the frames of British thinking itself, the law seemed to produce striking anomalies. Although the distinctions shaping the colonial legal structure grew out of the intersections between colonial realities and European thinking about political economy, the vision of “public” authority projected under the Canal Act was cast as the antithesis not only of the “customary” realm of water control but also of water buying and selling. Yet the result of this, as Edward Maclagan noted in passing, was that private water selling had become legal under the colonial regime only when it was seemingly cast as operating within the realm of customary relations (as, for example, by water lords).¹²⁸ Though this was, a century later, to become the subject of much debate (as will be discussed in chapter 7), it simply added in the late nineteenth century one more tension to the larger structure of water law and control and to the meaning of “public” control.

The British sought in the early twentieth century to legally clarify the situation by proposing new legislation that harked back to Lyall’s suggestions two decades earlier. If the principles of the 1873 Canal Act and those of “customary rights” were not easily brought into harmony, administrators sought to deal with this after the turn of the century by proposing a new statutory framework for “minor canals,” those in which customary forms of local community were viewed as playing an important role in canal operation. “Hitherto,” as the statement of objects and reasons of the Minor Canals Bill of 1905 declared, local questions of chher labor, customary water shares, records of rights, disputes about distribution, and so forth had generally been “provided for in Settlement engagements, and by agreement between Government and those interested in the maintenance of efficient irrigation arrangements.” They had thus been handled outside the statutory framework of water law. “But with increased sophistication and the extension of the reign of statutory law it has become necessary in the interest both of Government, of right-holders, and of irrigators to secure a legal basis for what heretofore rested merely on executive authority.”¹²⁹ The key to further rationalization of water administration was thus to bring such issues within the direct ambit of the state’s “public” legal responsibility and regulate them by special forms of statute.

Even if this opened the prospect of a more unified “public” framework for the administration of water law, it by no means resolved the system’s underlying

tensions. As the passage of the Minor Canals Act itself illustrated, British officials realized clearly that, on many canals, nonbureaucratic participation in the distribution of water and maintenance of channels was critical to the success of irrigation. Whether on the kuhl of Kangra, the inundation canals of southwestern Punjab, the “private” canals of Punjab’s water lords, or the government’s own Bari Doab canal, the logic of flowing water required local cooperation and irrigator participation in ways not easily accounted for by the Canal Act of 1873. The problems in reconciling rational statute and popular custom, however, lay not just in the technicalities of local irrigation management (though that was certainly an area of much commentary). Local forms of irrigation management could and did vary enormously in different local settings, as could the effectiveness of local cooperation, as more recent social science has suggested—depending on a variety of natural and social structural circumstances. But the larger framework for this was also shaped even more pervasively by the deep-seated conceptual dichotomies defining “modern” colonial statecraft itself. The state’s claim to “public” authority lay in its separation of a realm of rational administration and individual production from a realm of blood and custom, a separation that morally legitimated the overarching authority of the colonial regime as a modern state. But the basic conundrum remained: how was the structure of water control to be integrated into a structure of imperial statecraft defined equally by the state’s position as the owner and supplier of water to rational, productive individual producers and by the state’s claim to derive its authority from its support of a structure of indigenous communities rooted not in cooperative production but in the indigenous, countervailing realm of patriarchy, genealogy, and blood?

This conundrum, whatever its distinctive colonial inflection, was of course linked to the larger political role of community and environment in the definition of the modern state more generally—and it was thus a conundrum that was to play out in twentieth-century politics. In more immediate terms, it took on new significance in the twentieth century when cast against the backdrop of the stunning new developments in irrigation policy that began to transform irrigation in the last decades of the nineteenth century. With the beginnings of the policy linking state investment in perennial canals with large-scale agricultural colonization—the policy that produced Punjab’s new canal colonies—the context for British thinking about these issues began to change. A new foundation for state authority, linked both to emerging irrigation technologies and to scientific definitions of the environment, began in the last decades of the nineteenth century to strongly influence the politics of irrigation. Control over the environment began to shape new, theoretical visions of state power. Indeed, it was against this backdrop that the term “minor canals” had now taken on meaning.

Science, the State, and the Environment

Engineers in general do not talk much; with becoming modesty, they are content to let their achievements speak for themselves.

—PUNJAB PUBLIC WORKS DEPARTMENT, *MANUAL OF IRRIGATION PRACTICE*¹

Rain came from above as God willed it, in plenty or otherwise, and nobody could stand face to face with God and demand adequate rain, but one could go up to a canal officer and demand water; all he had to do was enlarge the outlet.

—PRAKASH TANDON, *PUNJABI CENTURY*²

The appeal to science as a frame for both environmental transformation and new claims to state power was, in the last decades of the nineteenth century, not new. But in the years from 1860 to 1890, it was not science but law that was the major obsession of British administration in the Indus basin as the British sought to bring order to India and morally legitimize the power of the British state. As we saw in chapter 4, rationalizing legal statutes (such as the 1873 Canal Act) provided the major levers through which the colonial state defined itself as a modernizing, developmental agent, even as the state balanced this with legal appeals to “custom” in an effort to shore up the indigenous foundations of its own legitimacy. But in the last decades of the nineteenth century, science began to play new roles in shaping British efforts to directly transform the Indian environment, provide new sources of revenue, and define new claims to state power. State control over irrigation was increasingly seen as linked to the state’s power to transform the physical environment of the Indus basin itself. This was hardly a development independent of the structure of law, but it represented an effort to sidestep, in effect, many of the contradictions embedded in the conceptual structure of the law (which we saw operating in the previous chapter) through direct state action on the physical environment itself.

There were significant parallels between law and science as frames for the legitimizing claims of the colonial state in the late nineteenth century. Perhaps most

important, both were conceptualized as realms of power that stood apart from everyday politics and from the forms of “natural” local, kinship-based allegiances that defined particularistic loyalties. Both law and science justified the state’s dominance through an appeal to principles of impartiality and detachment on the part of the rulers, whether linked to a “rule of law” that theoretically transcended the self-interest of political power, or to a commitment to science and technology linked to a scientific “temperament” dictated ultimately by rational adaptation to nature’s own independent laws. Though building on parallel conceptions of state authority, law and science defined different frameworks for encapsulating local forms of politics and community within larger frameworks of state control and administration. New technologies of environmental control linked to science did not displace the old structures of legal authority that lay at the heart of colonial statecraft, nor did they displace the linking of individual property to village genealogies of “blood” as the colonial revenue order had been mapped on the land. But they layered onto these forms a powerful new structure of state authority, encapsulating newly settled communities within a vast structure of canal works physically “commanding” the Indus basin’s “wastelands” on a previously inconceivable scale—and defining them as subject to a larger environmental “system.”

In technical terms, what marked the period after 1890 as a new era in canal building was the growing domination in Indus basin irrigation works of perennial rather than seasonal canals. Perennial canals flowed year-round and were controlled by permanent weirs on the rivers. They were hardly new in the region in these years.³ But their relative domination over seasonal canals was linked in this era to an emphasis on carrying water to arid “wastes” that had not historically been reachable by inundation canals. The new era was thus defined not just by the dominance of perennial canals but also by the large-scale agricultural colonization of previously uncultivated (or intermittently cultivated) lands, leading to the agricultural colonization of vast new canal colonies in the Punjab and (to a considerably lesser extent) Sind.⁴ This was an era marked also by the emergence of new visions of environmental control tied to the growing professionalization of water engineering.

ENGINEERS AND WATER CONTROL

The origins of this shift lay not initially in any grand plan but in ongoing adaptations to the problems inherent in dealing with the highly seasonal character of Indus basin flows—and of the problems of canal administration to which the problems of seasonality had given rise. This was evident in the history of the Chenab canal, whose story tracked the critical transition in Indus basin irrigation during these years. The Chenab canal was originally constructed in the 1880s as an inundation canal, with little relationship to (or thought of) large-scale colonization in the high *bar*. But problems in silting so limited the Chenab canal’s initial

workings that engineers proposed dealing with the problem by constructing a weir on the Chenab river to raise the water level and improve the flow. The construction of a weir, however, raised new problems. Silting and variable seasonal flow had in the past made it impossible for inundation canals to sustain significant permanent settlement in the large government wastelands of the central Punjab *bars*, since neither rainfall nor wells were adequate in areas of such low water tables to sustain a permanent population when the canals seasonally ran dry. But if the government were now to recoup the costs of the new Khanki barrage, the calculus of the Chenab canal would have to be changed. Indeed, to make the barrage pay, the Chenab canal would need to be significantly enlarged and pushed deeply into the unsettled interior of the Sandal *bar*. The key was the linking of a new, perennial water supply on “wastelands” to large-scale agricultural colonization.

From these considerations, the Chenab canal thus evolved into the large-scale spine of the first great Punjab canal colony. In spite of some earlier attempts at agricultural colonization on the Sidhnai canal in Multan, the linking of the Chenab canal to the large-scale settlement of the Sandal *bar* marked the true beginning of a new era in landscape transformation when the Chenab colony officially opened in 1892. With an annually irrigated acreage that eventually approached two and a half million acres (or approximately 3,500 square miles), the Chenab colony became, in the words of a government of India review of irrigation in 1918, “easily the most productive work in India,” with a financial return on investment of almost 40 percent annually. The opening of the Jhelum colony in Shahpur district in 1902 followed quickly on the Chenab colony’s heels. These models led ultimately to the huge Triple Canal project, completed in 1915, which brought water through link canals from the Jhelum and Chenab rivers to settle the “wastelands” of the Lower Bari Doab colony in the high *bar* of Montgomery and Multan districts—and in the critical connection of this large colonization to the emerging engineering view of the Indus rivers as an interlinked system. By 1918, the number of acres irrigated by government canals in the Punjab had increased more than six-fold over what it had been forty years earlier⁵ and, more importantly, had defined a dominant new pattern of canal development that would change the history of Indus basin irrigation irrevocably.

The evolution of this pattern was linked in critical ways to the piecemeal development of efforts to deal with the Indus basin’s seasonal dynamics, but it was also a development connected to newly emerging scientific emphases in the professional development of water engineering. Perhaps equally as important, these influences shaped new *spatial* visions of power in its relationship to state administration and control. Spatial units of land were increasingly framed within the new canal colonies not just by law and village mapping (though these remained important) but also by their place within a simultaneously natural and engineered river basin. Irrigators’ fields and village boundaries were drawn within the colonies

largely in accord with the engineered lines of branching canals and surveyed squares, whose meaning and authority derived not primarily from law (or history) but from a new system of engineered canal networks that tapped and channeled nature's energy for productive purposes. Local canal networks were also increasingly envisioned as part of an interlinked whole in which no canal could be imagined as operating entirely independently of the flows feeding other canals.

In the process, a new era of canal development held out the promise of a different sort of "community" of production rooted in the preeminence of engineering. "Technology," as Gyan Prakash puts it, "forged a [new] link between space and state,"⁶ defining a vision of state power linked to control over the physical landscape itself, and characterized by the encapsulation of individuals and communities, not just within frameworks of property and law but within engineered water flows. Whatever the connections between rationalized management and the legal structure of the Canal Act, this was an era defined by a new vision linking engineers and irrigators alike in a community of production shaped by the contours of nature itself—a vision with the potential to reshape relations between state and society.

The Professionalization of Irrigation Engineering

The increasing importance of an engineering worldview in shaping water development in this period requires a brief foray into the intellectual and institutional history of nineteenth-century engineering. The professionalization of engineering in India can perhaps best be dated from the founding of two key educational institutions in the mid-nineteenth century: the College of Civil Engineering at Roorkee, northeast of Delhi (founded in 1848 and renamed the Thomason College of Civil Engineering in 1854), and the Royal Engineering College at Cooper's Hill in England, founded in 1870 with government of India funding.⁷ These schools were hardly equal; reflecting the racial hierarchies of colonial administration, Cooper's Hill graduates were given higher pay and better access to positions than those trained at Roorkee, whether Indian or European.⁸ Yet in some respects the colonial roots of both Roorkee and Cooper's Hill helped to foster the emergence of a distinctive professional ethos in British engineering that transcended these divisions and shaped an emerging vision of engineering as a "public" profession.

The key to this lay in the linking of professionalization with service to the colonial state. As Richard Temple noted in the 1880s, Britain had long held a reputation for backwardness in technical education as compared with the countries of continental Europe, since engineering instruction, geared toward private employment, tended to be conducted in "private establishments at the industrial centres of England." The only important exception to this was in the military.⁹ But by the last decades of the nineteenth century, the British government in India had come to have such "colossal interests at stake in its public works," as Temple wrote in 1883,

that this structure was being transformed. With a growing need for well-educated engineers and with “immense resources for so arranging its plans that this object shall be secured,” the structure of colonialism itself played a central role in shaping new forms of engineering education.¹⁰

The joining of the prestige of mathematical science with the prestige of state service was key to the educational experience at both Roorkee and Cooper’s Hill. As a Punjab Irrigation Department manual later suggested in tracing the development of irrigation engineering in the Punjab, earlier military engineers had no doubt worked with “amazing courage and resources.” But “their knowledge of irrigation and hydraulics was *nil*.” The mid-century Bari Doab and Sirhind canals had thus been built with “beautifully drawn and skillfully colored plans” but with “shocking mistakes of design” that had been corrected only by dogged persistence.¹¹ By the 1880s, however, the new educational institutions had changed this. For students themselves, the effects of this education were often transformative. Cooper’s Hill, as Temple put it, taught not just technical skill in engineering but also the “moral training” and “discipline” that would prepare students for “victorious success” in controlling the world.¹² At Roorkee, as William Willcocks later wrote, “we were taught on the sound lines of the Ecole Polytechnique in Paris, and not on the ridiculous lines generally in vogue in England at the time.” Professors at the college had aspirations for “world-wide science.”¹³ For Indians such as Ram Das Tandon, who graduated in 1898 and joined the Punjab Irrigation Department, the process of becoming an engineer at Roorkee was like passing through a transformative “dream,” defining an entirely new “public” identity.¹⁴ With the engineering profession now “on its feet,” many engineers could cultivate a selfless, scientific self-image; they were “content to let their achievements speak for themselves” (as the Punjab *Manual of Irrigation Practice* put it in this chapter’s epigraph), even as they identified strongly with the “public” power of the colonial state.¹⁵

Water’s Duty: The Language of Engineering Control

To understand this new ethos—and its political implications—it is important to take a brief foray into the language of engineering and its metaphorical views of nature’s control. As the inspector-general of irrigation in India put it in 1920, “exact terminology” was “the first essential to sound progress in any special work of a scientific character.”¹⁶ Perhaps no single term was more redolent of the underlying assumptions that shaped water engineering in the late nineteenth century than the concept of water’s “duty.” In its everyday usage, the term “duty” captured the sense of moral responsibility and civilizing mission associated with many of the new emphases in engineering education. In the colonial context, it was a term that harked back to the sense of imperial mission embodied by men like Sir Robert Sandeman. But, in the context of professional engineering, “duty” was a term applied directly to water, and it signaled the power of engineering knowledge to make nature complicit in man’s purposes.

In technical terms, “duty” was a measurable quantity; it defined “the relation between the volume of water and the area of crop which it matures.” Though its precise measurement varied somewhat in different contexts, it was usually expressed in India in terms of the number of acres of cropped land that a cubic foot per second (cusec) of water could be expected to bring to maturity in a particular period of time: thus, “if 1 cubic foot a second running continuously for four months will mature 100 acres of crop, the ‘duty,’ in that case, is said to be 100 acres to the cusec, to the base of 4 months.”¹⁷ “Duty” was thus a fundamental measure of the ultimate goal of irrigation science—the extraction of productive capacity from water. As Herbert Wilson noted in a leading irrigation textbook of the late nineteenth century, “[O]n the duty of water depends the financial success of every irrigation enterprise, for as water becomes scarce its value increases. In order to estimate the cost of irrigation in projecting works, it is essential to know how much water the land will require. In order to ascertain the dimensions of canals and reservoirs for the irrigation of given areas the duty of water must be known.”¹⁸ Duty was, in other words, a measure of the “work” that, with man’s guidance, nature could perform.

The centrality of “duty” to late nineteenth-century irrigation engineering had roots in broader shifts in nineteenth-century scientific thinking about nature. As M. Norton Wise and Crosbie Smith have argued, the middle of the nineteenth century had witnessed a fundamental shift in the dominant view of nature among scientists—from one stressing a “balance” of natural forces, tending toward timeless equilibria, to one that stressed the importance in nature of perpetual change and of the tendency of natural systems to move relentlessly toward energy dissipation.¹⁹ This was the context in which the term “duty” gained currency. In origin, the term was first technically applied in Britain as a measurement for assessing the efficiency of steam engines. As used by James Watt in the late eighteenth century, for example, the efficiency of a steam engine in pumping water was measured by the “duty” (or work) it could perform: the number of pounds of water that the engine could raise one foot per bushel of coal as fuel.²⁰ “Duty” was thus rooted in the concern for the efficiency of energy use within a mechanical system, and its usage in irrigation engineering reflected a powerful view of canal systems as metaphorical “engines” or “machines” within which the conservation of energy—and the control of “waste”—was central. “We may look on [the canal] as a great machine composed of many parts,” J. S. Beresford wrote in 1875 (of the Ganges canal), “and go about calculating its efficiency much in the same way as that of a steam-engine.”²¹ Using the same language, R. G. Kennedy attempted to calculate in the 1880s the duty of the Bari Doab canal measured from its offtake at Madhopur, taking into account the water losses that occurred in its various parts, and concluded: “Considering the canal as a machine, its efficiency was 28%” (that is, only 28 percent of the water taken off at the head reached the root zone of plants to perform its work).²²

Such statements reflected the central imperative of late nineteenth-century water engineering. Any water engineer “should begin with the principle,” Bruno Latour writes, “that if water can leak away, it will.”²³ It was this preoccupation—with thwarting the natural tendency toward waste—that defined both the mission of most irrigation engineers and their discipline as a mathematical craft.

“Commanding” the Land

This preoccupation was dramatized most clearly by the science of water flow, which was the key to making water perform its agricultural work on the land—and to the definition of a new spatial vision of the environment linked to these principles. By modeling and measuring water flowing through an interlocking system of rivers, canals, distributaries, and watercourses, irrigation engineers increasingly imagined themselves as managing a hydraulic *system* composed of innumerable discrete but interlocking and measurable parts. This was the irrigating “machine” that science has called into existence. But these parts were not simply man’s creation; they mirrored the structural features shaping water’s flow within the river basin itself as a *natural* system. The aim was that, with man and nature aligned, water could thus be made to “command” the land for agricultural purposes. The role of science was to tap into and channel nature’s own independent energy.

Each structure of water delivery was thus (in emerging engineering theory) linked to every other structure, and each was, in turn, linked to measurable units of “commanded” land, which provided the frames for water’s work. The term “command” was, like “duty,” a piece of technical engineering jargon that helped to forge the alliance between man and nature by metaphorically imputing human characteristics to water. In engineering jargon, it was not water that was to be “commanded” but water itself that was, with man’s assistance, to “command” the land. The “command” of a particular canal referred, in technical parlance, to the (measured) area of land that could be reached through gravity flow by water from that canal. Water’s “duty” could thus only be fulfilled when the land was brought under canal “command.” Indeed, the term operated on a hierarchy of levels, as the “command” areas of the smallest channels were nested within the “command” areas of larger distributaries and canal systems. These interconnections suggested how the control of flowing water encompassed also a system of nesting units of land, reaching down (in theory) to the fields of every water user, all “commanded” by canal systems.

Although the science of water flow (hydraulics) was a universal science, the application of these principles in the Indus basin was shaped by its own distinctive environmental conditions. The defining features of the Indus rivers were, of course, their highly seasonal flow and their heavy silt load. Maximizing “command” meant neutralizing the variations in seasonal flow, and as a result the overwhelming focus

of the new engineering science was on perennial canals, which ran year-round by capturing the low seasonal flow in Punjab's rivers behind large weirs, whose shutters were raised to let high water pass through during periods of flood. Canal levels were controlled—unlike on inundation canals—by head regulators.²⁴ Though engineering management continued to focus on reforms in inundation canal operation, cutting-edge professional engineering was seen now to focus almost exclusively on perennial canals. Some leading engineers, such as S. L. Jacob, former chief engineer of the Punjab, referred to canals subject to seasonal flow as only a vestige of “an early stage of civilization” that would be gradually replaced by perennial works.²⁵ In such a worldview, the remaining seasonal canals (though still of local importance in some areas) were increasingly dismissed with the moniker “minor canals.”

Far more central from a scientific, hydrological perspective were the problems posed by the Indus basin's heavy silting. In engineering terms, the problem of silting was (at least) two-fold. First, silting and scouring processes significantly complicated the mathematical modeling of flow in canal channels as parts of interlocking hydraulic systems. Engineers had long sought to calculate the water flow needed in each channel so that the capacity of the channel would be “exactly proportional to the duty to be performed” at each outlet, as this was essential to applying water systematically to bounded pieces of land.²⁶ But heavy silt loads vastly complicated this process. More critical was a second problem, that of silt accumulation in channels, which was historically linked to the need for annual labor mobilization for silt clearance. The requirement for such labor mobilization seemed to compromise the claims of “modern” irrigation science to transcend the local political entanglements long associated with labor mobilization and thus to define the power of engineering knowledge to operate independently of local politics. Solving the problem of silting was a critical measure of engineering's ability to transcend its own Indus basin past.

An engineering breakthrough with implications for silt clearance on perennial canals had occurred on the Bari Doab canal in the 1880s. R. G. Kennedy, later chief engineer of the Punjab, was the first to propose a mathematical theory for flow modeling in unlined channels that would allow engineers to obviate (at least in theory) the need for annual silt clearances. Based on empirical observations on the Bari Doab, he defined a formula for what he called “regime channels,” or canal channels in which silting would in theory come to balance scouring over prolonged periods of operation. This would allow canals to be designed so that they would evolve toward their own self-regulating “regime.” Kennedy's formula, though later much modified (most importantly with the introduction by Gerald Lacey in the 1930s of a factor for the size of silt), had by the turn of the century laid the foundations for major shifts in Indus basin canal design and flow management.²⁷ “Regime channels” of course still required careful monitoring and sometimes the periodic

remodeling of outlets to maintain design specifications at each outlet as a canal “found” its regime.²⁸ As one engineer commented with respect to such channels, “An irrigation system in its parts comprises a very delicate machine, and these several parts constantly require adjustment and overhauling; to deprive the machine of these adjustments can only spell immediate loss of efficiency and in a very short time disaster.”²⁹ Such monitoring—and particularly outlet remodeling—was itself a periodic source of irrigator protest, as we shall see. Nor, in the end, did a focus on canal “regimes” obviate altogether the need for occasional canal closures and silt clearances in perennial channels. But the mathematical definition of “ideal” regime channels in which silting balanced scouring at prescribed canal slopes was nevertheless critical in facilitating the engineering agenda of gaining “objective” control over channels and freeing canal management from the periodic mobilization and management of irrigator labor, which, more than any other aspect of Indus basin canal history, linked back to a world of “custom” and local social organization. The aim was now to control the problems of silting and differential flow not by mass labor mobilization or by the mobilization of local “community” but by understanding nature sufficiently fully that science could tie itself to nature’s own “regime.”

Modeling and controlling the flow in channels was, of course, only the first step in defining a hydraulic system that encompassed the irrigation of the Indus basin. The interface between regulated water flow and measured quantities of commanded land was also critical, for this was ultimately the key to water’s interface with the structure of property—and to the measurement of water’s duty. Canals in the mid-nineteenth century had often delivered water to villages through open, uncontrolled cuts, but the establishment of departmental control over outlets had already emerged as an important legal principle in the 1873 Canal Act.³⁰ With advances in engineering theory and control of flow in channels, control over outlets became all the more critical as agricultural colonization developed. Considerable engineering attention was thus devoted in the late nineteenth and early twentieth centuries to the design of “modular” outlets that could effectively regulate the flow into irrigator watercourses, independent of any actions taken by the irrigators themselves. Irrigators had long sought to increase the supply from outlets not only by “tampering” but also by deepening their own watercourses to improve the draw. Central to engineering imperatives was thus the design of self-contained “modules” that could deliver water independent of such pressures. As K. R. Sharma later described the problem in an engineering textbook: “The supply drawn by a non-modular outlet is forever changing independent of surface level in the supply channel [due both to irrigator action and changing natural circumstances in watercourses], and thereby affecting the general distribution of supply in a manner entirely beyond the control and management of those responsible for distribution.” The goal “on a moduled channel,” Sharma wrote, was therefore to arrange the distribution “entirely independent of the arbitrary changes in watercourse condi-

tions” so that it would be “dependent only upon conditions in the supply channels under government control.”³¹ The design of modular outlets—though a long and difficult process³²—thus went hand in hand with the engineering concern to mathematically match water to the particular measured pieces of land, a practice called *chakbandi*.

No one imagined, of course, that this could be done independently of local conditions, whether natural or social. Calculating the proper full supply to deliver water in new channels itself depended on innumerable mathematical and local variables. As Sharma wrote, “The relation of water supply to the land depends on the rainfall” and on “the composition of the soil.” It depended on the crops to be grown and on the skill and character of the cultivators. But these variables could all be captured (at least theoretically) through the calculation of different values for water “duty” under such differing conditions. Since the projected duty of water varied with the crop, engineers calculated the water requirements (and numbers of waterings) of each expected crop. These were then combined with a determination of the irrigating “intensity” on each distributary (that is, the percentage of the “commanded culturable area” that was to be irrigated in a particular season) in order to determine the quantity of water needed in each canal.³³ At the same time, planning for each channel took into account the water demands for different crops at different times of year. Finally, *chakbandi* statements were prepared for each outlet, suggesting the total outlet discharge required for each measured area, or *chak*. Putting this together gave the “full supply factor” for the channel and dictated its design parameters. Engineers were expected to work out all of this mathematically, as a prelude to making sure, once channels were built, that they operated according to specifications.³⁴

All of this, of course, was in perpetual tension with the realities that many engineers encountered on the ground. As T. R. J. Ward put it, “The indoor [or office] functions of the Punjab irrigation officer with regard to the allocation of the supply would seem to consist of simple arithmetical calculations.” But the “outdoor” functions involved “work that will insure that the channels in his charge distribute this supply equitably.”³⁵ Though newly minted engineers had to learn the formulas for all these variables, most were well attuned to the importance of local conditions—and sometimes to “local knowledge” as well. As Michael Lewis has argued, this was an important element in the training of many engineers.³⁶ Whether in the development of effective modular outlets or in the operation of regime channels, irrigation engineers were well aware of the ongoing problems in realizing in operational terms the mathematical goals that defined their science. As one engineer admitted in 1913, the use of outlets to match flow to irrigated areas was often, in practice, as much a matter of trial and error as of “mathematical precision.”³⁷ Projections of crop percentages and irrigation intensities gave no guarantees that these levels would actually be reached. Senior engineers knew well the range of political and

administrative constraints that intruded on canal operation, whether in matters of bureaucratic corruption,³⁸ water pricing,³⁹ or even, in some cases, basic projections of water duty.⁴⁰ But the mathematical modeling of hydraulic variables nevertheless took on new importance by the turn of the century, shaping a vision of the Indus basin water system as an environment of discrete interrelated parts, a vision that supported an engineering alliance with nature, predicated on scientific understandings, that promised new levels of state “command” over the land. This was, as most engineers realized, a framework—unlike the law—in which irrigator “custom,” whatever its occasional intrusion into engineering practice, had no *formal* place at all.

The Indus Basin as an Integrated Water Environment

The most powerful exposition of these principles occurred in the mobilization of a macro-level vision of the Indus basin as an integrated river basin environment composed of multiple parts. This did not mean, of course, that every canal required the same structure of administration, for water control in the region continued to show a high degree of diversity in different jurisdictions. Nor was the entire river basin by any means incorporated into this vision. But the logic of irrigation management in the canal colonies suggested that, at the cutting edge of professional science, all irrigation systems on the plains had now to be considered, to some degree at least, as part of an interrelated, technical whole. This was brought most clearly into focus in notes submitted to the Indian Irrigation Commission of 1901–3, which was appointed to review Indian irrigation policy, in part in response to the specter of famine in many parts of India, and in part in response to the new possibilities for irrigation raised by the Chenab colony’s success.⁴¹

The need to see all irrigation in light of the larger interconnections of the hydraulic environment was suggested most clearly in a note to the Irrigation Commission written by Jacob. In the wake of experience in the Chenab colony, he sharply criticized the narrowness of earlier irrigation planning. “Hitherto,” Jacob wrote, “each scheme has been looked at independently as complete in itself.” But the Chenab colony had shown the folly of this view. With vast wastelands in the Indus basin still available for transformation, water had to be moved, Jacob argued, from areas where it was in abundance to areas where it was in deficit, so that a maximum quantity of land could be brought under “command.” The government had, in the past, often resisted such large projects for fear that water would be inadequate or “that the vested rights of old irrigators” would be disrupted. But for the future, he implied, the logic of the river basin (that is, of nature itself) had to be given precedence. Jacob laid down two principles, rooted in the engineering obsession with controlling waste, that defined the imperatives driving engineers to increasingly see the Indus basin as a technical whole: “(1) use, if possible, all the available water and do not let any be wasted; (2) spare no effort to irrigate every bit

of land which needs irrigation.”⁴² Only if these principles were realized, he implied, could the Indus waters be made to perform their optimum “work.”

It was such a view that empowered the most audacious plan to come out of the deliberations of the Irrigation Commission, namely the suggestion that water should now be moved from river to river within the Indus basin in order to maximize its effective “command” of the region’s wastes. The success of the Chenab colony had vastly increased engineering confidence in the power of science to transform the environment by bringing water to wastelands. But the immediate problem facing irrigation engineers at the turn of the century was to find sources of water to irrigate the huge government wastes that remained in areas where water was scarce on the plains, particularly the Lower Bari Doab. Supplies in the Ravi, which could most readily command the Bari Doab, were inadequate to the needs. Only if water constraints were considered in terms of the Indus system as a whole, some engineers now realized, could the problem be effectively addressed from a technical viewpoint. It was Jacob and James Wilson (a prominent civil official) who first proposed the solution: simply move water from the western rivers (Jhelum and Chenab), where water was ample, to the eastern river (Ravi), where supplies were limited. This plan, which came to be known as the Triple Canal project, was endorsed by the Irrigation Commission and finally designed in 1905 by the Punjab chief engineer, Sir John Benton, a Cooper’s Hill graduate. Completed in 1915, it involved the construction of two huge link canals (Upper Jhelum and Upper Chenab) that moved water eastward from the Jhelum to the Chenab to the Ravi, so that enough water would be available in the Ravi to fill the Lower Bari Doab canal and open the wastes of the Lower Bari Doab to agricultural colonization. It thus dramatized in practice what Jacob had underscored in his memo to the Irrigation Commission—namely, that the effective use of water to irrigate a maximum quantity of land required a view of the Indus rivers as part of a single water system (see map 7).⁴³

The Triple Canal project defined the emergence of a new era in Indus basin irrigation. Only when the waters of the Indus basin system were seen as a single integrated hydraulic system, in which water could be moved from one river to another, was it possible to make effective “use” of all available water to irrigate all available wastelands. The project signaled a vision of environmental control on a macro level that mirrored the forms of local control rooted in the modeling of flow to each irrigation chak. Though it hardly allowed for complete management of flow (which varied markedly from season to season, continuing to bring serious flooding in the summer season), it had made clear that the marshalling of scarce water supplies and their careful distribution between separate canal “commands” was now critical for maximizing the “wastes” opened to agriculture. The superintending engineers of the five “linked canals,” as they were now called (Upper Jhelum, Lower Jhelum, Upper Chenab, Lower Chenab, and Lower Bari Doab), which

watered the major canal colonies of the Punjab, met annually after 1915 to discuss forecasts of needs and supplies and to try to match water availability to water needs, moving water from one river to another (often by rotational openings and closures of canals) as requirements dictated. As a metaphorical “engine,” the irrigation system had thus increasingly become an integrated whole, defined by its many interrelated parts.⁴⁴

Indeed, once such a conception was in place, even older systems of irrigation, such as Punjab’s inundation canals, came to be subjected to new forms of systemic evaluation. With the opening and expansion of the canal colonies at the turn of the century, local officials had increasingly been forced to take cognizance of the interconnections that existed even between inundation canals and the larger perennial canal system. Large-scale canal colony water withdrawals inevitably influenced downstream irrigation, particularly the critical opening and closing dates of inundation canals in the spring and fall, when adequate water was often critical to successful cropping. Debate thus focused on the degree to which rivers were recharged by canal colony irrigation water draining back into the river system, an issue open to conflicting interpretations of (still limited) flow measurements.⁴⁵ This also defined new interconnections between irrigation in Punjab and in Sind, as we shall see in the next chapter. But the pressures on inundation canal management suggested how even “minor canals” were swept into this systemic river basin vision.

WASTELANDS, CANALS, AND STATE POWER

Such a sweeping, unifying, technical, and environmental definition of the Indus basin carried, of course, its own political implications. Engineering doctrine held out the prospect of a new vision of “community” and of the “common good.” This was shaped by a new vision of nature—and a new sense of common interest, transcending individual property interests—that linked experts and irrigators alike within a vision of the “natural” environment. However partial the relationship of this vision to the ongoing realities of the Indus basin, the vast expansion and success of the canal colonies had, by the turn of the century, begun to give this vision a real purchase in the minds of many British administrators.

The political implications of this new engineering vision of the Indus basin cannot be fully understood except in terms of the intersecting scientific and revenue meanings of a key term in this vision: the word “waste.” Indeed, this engineering vision of controlling “waste” must be juxtaposed against the different meaning of “waste” that had already been inscribed by the property system on the vast stretches of state-owned “wastelands” that the canal colonies came to occupy. “Wastelands” were, under any definition, considered ripe for the operation of science, for they were, by definition, lands waiting to be put to “use.” But “waste” also had another—

and in some ways equally important—structural meaning within the colonial property order. The concept was a key to the marking—and ordering—of distinctive forms of property and community on the land. The association of the village “community” with “waste” (through the commons) and of government power with “waste” (through its direct claims on all nonproductive, nonrevenue-paying land) were central features of the political system and of the ways that the colonial state had sought to stabilize its authority on the land. This is why, at least within the structural framework of British power in the Punjab, the meanings of the canal colonies were ambivalent. On the one hand, irrigation and settlement on the “waste” represented a vast accession of power and revenue for the state, as these lands were made “productive.” On the other hand, the transformation of the “waste” on such a scale threatened to undercut another, critical vision of state legitimation that was powerfully linked to the structure of landed property. This was a vision rooted in the state’s self-definition as a public entity, standing above and apart from the separate worlds of local “community” and production alike, and regulating both through law and through the legal differentiation of productive, revenue-paying land and “waste” on the ground.

Engineering and State Wastelands

This tension can be tracked in the history of British attitudes toward “wastelands” that led up to the launching of canal colonies and that shaped their subsequent development. The history of state control over wastelands in the Indus basin was, as we have seen, a complex one. State control over considerable quantities of wastelands had long been an important feature of the colonial property system, which was reflected in the important meanings attached to “wasteland” in the Punjab’s property settlements. In extensive arid tracts, such as in the *bar* lands of western Punjab’s doabs, state-controlled wastelands were extensive, representing, essentially, that which was left over after wastes were assigned to villages at settlement, and it was on these lands, in the era before the canal colonies, that the government had often given individual leases, convertible to individual property contingent on individuals sinking wells or (in the case of water lords) building canals in order to make them productive.⁴⁶ Some state rakhs were also set aside in Punjab for other nonagricultural purposes, such as fuel or forest reserves.

However, as an alliance of state and science developed increasing significance in the last decades of the nineteenth and early twentieth centuries, such “wastelands” had begun to take on new meanings for state officials. Changes in government attitudes toward “waste” can be tracked through shifting government policies beginning in the 1880s. By that time, state wastes were scarce in much of central and eastern Punjab, where agriculture had expanded considerably from the time of annexation, and this alone led the government to become more protective of state rakhs, sometimes for specific “developmental” needs, such as timber

or other resources for railway development. Many rakhs were assigned to the Forest Department.⁴⁷ But in western Punjab, where arid state wastes were far more extensive, shifts in state wasteland policies followed a different trajectory, though one equally dramatic. By the early 1880s, there were over 12,000 square miles of *bar* land on the Punjab plains that were in government rakhs (used largely for grazing), of which about 15 percent were controlled by the Forest Department.⁴⁸ In spite of the quantity of these lands, however, officials after 1880 became increasingly wary of leasing such lands to individuals, even when they promised to sink wells or build small canals. The fact that this would lead to the establishment of proprietary rights now appeared to many officials to be precisely the problem. Control of such lands was, in a sense, a marker of state power. But, more important, the state increasingly saw the developmental potential of such lands, increasingly seen to hinge on state knowledge, as threatened by the spread of private interests.

British policy toward “wastelands” thus showed a critical shift, and one that was closely associated with the rise of professional, state-based engineering. Rather than seeking to disperse wastes to villages and individuals—and thus to extend the colonial property order—the state sought increasingly to protect and engross wastes in order to make possible the direct operation of science on the land. Lt.-Col. E. G. Wace, the Punjab financial commissioner, put it succinctly in 1888: “[W]e have to deal with an entirely different state of affairs to that on which the old leasing system was founded. It is [now] the Government, and not the lessee, that makes agriculture possible by the construction of a canal at an outlay and with skill entirely beyond the means of the agriculturist.”⁴⁹ In some cases, the state even moved in these years to take back wastelands previously assigned to village communities, in order to make them available for state action (and eventual agricultural colonization), a trend that became increasingly marked as canal colony expansion progressed. The most dramatic example of this occurred in the case of the Sind Sagar doab, west of the Jhelum and Chenab rivers, where large areas of waste had previously been assigned to village commons. This had been done in earlier land settlements precisely to facilitate the incorporation of pastoralists into the territorial structure of village boundaries. But the British now introduced legislation to make the state re-assumption of these wastes possible. As Wilson wrote in 1900, “[I]t should be borne in mind that our object is to obtain, over as large an area as possible, an absolute right to grant what land we choose to colonists from a distance, without any interference from persons who have hitherto held or claimed any rights over it.”⁵⁰ Wastes thus assumed significance for their role not in the delineation and extension of the colonial property order but in the new exercise of direct state authority on the land.

This shift was clear in the canal colonies, where new peasant settlers were given leased land that was initially loaded with state conditions, as even with settlement

the state continued to assert its ownership of these “wastes.” “Peasant grantees were to remain as occupancy tenants,” Imran Ali writes, “and were not allowed to acquire proprietary rights.”⁵¹ In name, of course, the “village estate” remained the key framework for settlement in these colonies, but its technical meaning was transformed as it became synonymous in the canal colonies with an irrigation chak carved out of crown land. The technical structure of water delivery, engineered by the state, thus became the primary foundation for demarcating new mauzas. For this, the Sidhnai provided the ground on which British settlement policies were first delineated, whatever problems ultimately developed there with agricultural settlement. “What I wish to urge,” wrote Wace in summing up the initial plan for grants of land and for the establishment of villages on the Sidhnai, “is the very great importance of insisting that the several grants shall be demarcated with primary regard to the irrigating system on which they will depend for the success of their cultivation.”⁵² In carving the boundaries of each new mauza from the waste, the British made no pretense of relating such boundaries to “old associations,” or community territories. Rather, the key to the demarcation of each village was the area to be “commanded” by each minor distributary of the canal (an area of about 2,500 acres), which would allow every village estate to be defined ideally by its own distributary minor. Within each village estate, the land was then surveyed into squares, which were the foundation for individual leases and for the alignment of most watercourse channels within the village. The state’s direct control over the waste—and its control of hydraulic engineering science—thus framed its controlling power over a newly settled peasant society. Indeed, with the structure of settlement defined not simply (or even primarily) by colonial property law but by the new irrigation system’s “command” of the land, the developmental authority of the state was cast on new foundations.

Such structures were further elaborated in the Chenab colony and on later canals. In organizing colonization on the Chenab canal, Frank Popham Young decided to depart from the Sidhnai model in laying down in advance of the construction of irrigation minors a single grid of surveyed squares that encompassed the entire colony. It was the definition of the land as state waste, of course, that allowed the state to do this, ignoring all preexisting property claims. But Popham Young sought to link the structure of agricultural holdings even more tightly than in the Sidhnai to the engineering structure of irrigation. Beginning with the demarcation of squares for individual grants (each comprising in the Chenab colony approximately 28 acres, as opposed to 22.5 acre squares on the Sidhnai), he laid out also a grid of small squares (*killas*, one twenty-fifth of a large square, or just over 1.1 acres in size), each intended to constitute a “field,” or cultivating unit. Incorporated into village estates (or, in this case, chaks) that were demarcated on the basis of areas commanded by minor distributaries, “the next and most important step,” Young wrote, “was to induce the *zamindar* to permanently demarcate

the fields thus laid out by throwing up ridges or banks of earth [*kiaris*] on two sides of the small square, and by digging small distributary water-courses on the two other sides.”⁵³ This was possible, of course, only on fully level ground. But to the extent that this was accomplished, the principle originally articulated during the colonization of the Sidhnaï was extended, namely that “colonists must not be allowed to carve out for themselves amorphous polygonal holdings to suit their own whims, but that villages and grants must conform regularly to irrigation limits.”⁵⁴ From the demarcation of village boundaries to those of individual cultivating units, the aim was to encompass the system of cultivation within a frame of technical and environmental management defined by a scientific, irrigational structure.

The Irrigators and the Hydraulic System

In certain ways, much in the new relationship between state and society that began to emerge in the canal colonies was prefigured by the Canal Act of 1873. It was that act, after all, which had legally defined the authority of state-employed engineers to manage state-controlled canal systems in the name of efficiency. In its establishment of a contractual nexus between the state as the legal owner of all surface water and the individual water user, the act had also defined, at least in theory, the image of a large community of water users with common interests defined by their common productive dependence on water supplied by the state.

Yet the Canal Act had also been linked to a vision of agricultural expansion and development that was deeply embedded in an older colonial property order. The authors of the act had conceptualized water as being delivered by the state to property owners—that is, to men with both statutory and customary rights defined by their ownership of land. These property owners, as British officials conceptualized them, were embedded in communities defined not just by the relationship of individual producers to state-run canals—or to a larger hydraulic environment—but by the structures of law, custom, and common lands. The “village” had been typically defined in central Punjab as the nexus between property and “tribal” genealogy. It was a space rooted not just in a physical environment but in an environment of blood. It was the manipulation of this concept of the village—along with the expansion of the colonial regime of property—that had thus defined the moral foundations of the state’s earlier vision of expanding settlement and “development.”

Although the village also assumed a critical place in the canal colonies, the very structure of settlement in the Chenab colony defined a legal framework for colony villages—and for “development”—that was strikingly different from this earlier vision. Peasants were settled not as property owners but as long-term lessees on government wastelands, and, as a corollary, there were no separate wastes to be attached to proprietary village communities as share-based common lands. Squares of unallotted wastelands (*charagah*) were attached to colony villages for

grazing, but these, like village watercourses, were not community property; they were owned by the state.⁵⁵ But nothing, perhaps, signaled the new environmental framing of colony villages more clearly than the practice of naming them by assigning them numbers based on their position within the branching structure of distributaries defining the irrigation system of the Chenab canal. The contrast with villages in central Punjab, where names more frequently reflected the ancestry or tribal genealogy of the villagers, could not have been more striking. Not all colonists used the system of numbers; they sometimes called colony villages after the home villages from which the largest number of settlers came. But as the *Chenab Colony Gazetteer* noted in 1904, most settlers used these numerical designations in dealing with the government.⁵⁶ Even in the 1920s, as Malcolm Darling reported, the use of numbers for colony villages remained the rule. "Every village in the colonies has a number instead of a name," he wrote.⁵⁷

This contrast alone suggested the potentially new foundations of village community that state-sponsored settlement in the canal colonies opened out. Many officials saw the new form of the colony village as the space within which the individual villager could be remade to fit into a new kind of community—one defined less by its place in a world of blood and ancestry and more by its place in a larger state-engineered environmental structure. The key to this was the organization of space. As the basic success of the colony framework became clear, officials devoted considerable attention to village site plans that would mimic the regularity of agricultural allotments and the irrigation system so as to encourage discipline and a less parochial, genealogical mind-set among the villagers. Village sites (*abadis*) were increasingly laid out according to fixed plans. They were generally defined by broad central crossroads whose intersection, as B. H. Dobson put it, was to be "the pivot of village life, where the shops, well and public buildings are assembled." Settlers were required, in the words of the *Colony Manual*, "to build their compound walls on fixed alignments so as to ensure regular streets."⁵⁸ All of this was intended to encourage a simultaneously more ordered and more open public life, where the villagers themselves would be transformed in part through coercive rules (like those intended to produce efficient irrigation practices in the fields) and in part through new structures of space that would allow them to see their relationship to the larger environment beyond the village in new ways—and to become in the process willing accomplices in the state's new environmental and spatial project.⁵⁹

Incorporation of colonists into a larger system thus required, ideally, a mix of authoritative regulation and the encouragement of new spatial practices. This can perhaps best be seen in the new emphasis in colony villages on reforms in what the British called "sanitation"—a term redolent for the British of more cosmopolitan (and middle class) attitudes and of incorporation into a mind-set geared toward controlling nature's "waste" and disorder. This referred not just to matters relating to drainage and public health but also, more broadly, to the cleanliness and order

of the village site. Attention to sanitation was mandated in part through rules, failure to adhere to which made villagers subject to fines. But this was linked also to emphasis on new spatial practices that were intended to transform everyday village attitudes. As Dobson put it:

A vigorous effort has been made by persuasion and exhortation to banish noxious elements from the sphere of human habitation. Thus tanks are now frequently transferred at the request of *lambardars* beyond the pale of the boundary road: special areas are provided in the adjoining *charagah* for manure, which no longer fouls the dwelling sites: and grantees are encouraged to follow the admirable example set by Janglis and stall their cattle in steadings away from the *abadi* on cultivated land.⁶⁰

Model villages were erected on colony extensions where “educated” colonists, who were expected to devote maximum attention to “sanitation and general village improvement,” were settled to serve as “an example to the colony” as a whole.⁶¹ Rewards, including *khilats* (ceremonial robes), were given to the headmen of exemplary villages.⁶² Although villagers sometimes protested the coercion inherent in some government rules, the idea was to transform villagers into men who were more accepting of science and discipline (including self-discipline) and ready to take their place in a new system.⁶³ An internal transformation of the self would follow the external transformation of the colony space in which the individual was embedded.

Critical to this, of course, was also the new interdependence that the colonies generated between village and city. Planned market towns and rail lines were envisaged by colony planners to be just as important to the larger structure of the canal colonies as new irrigation works themselves, for they provided the central focal points for the commercial export of the colony surplus.⁶⁴ Towns were thus an essential part of the colonies’ larger environmental vision. Indeed, colony planners sought to turn new towns like Lyallpur, the central mart and rail link of the Chenab colony, into nodes of dissemination to villagers of both commercial and agricultural knowledge. With the establishment of an Agricultural College at Lyallpur, for example, the town became, as Darling later put it, the “main center of agricultural development” in the colonies, attempting to disseminate improved practices to the rural areas.⁶⁵ Beyond this, the city’s physical structure and organization of space dramatized the new linkages between city and village that would distinguish the colonies from central Punjab. Popham Young designed the center of Lyallpur in the form of a large square, laid out on four surveyed colony squares, with eight bazaars radiating in regular patterns from a central *chauk* (crossroads).⁶⁶ These bazaars, which were largely agricultural markets, were conceptualized much in the same way as the new village *abadis*, though on a larger scale, as symbols of order and organized community life. Perhaps most telling, a clock tower, a symbol of ordered regularity, stood at the very center of Lyallpur’s plan, built in the first dec-

ade of the twentieth century with the subscriptions, as the *Gazetteer* put it, of “the colonists of the Bar as a Memorial to the late Queen-Empress.”⁶⁷ Far more than in the rest of the Punjab, village and city were intended to become in the canal colonies conceptually interlocking parts of a common world.

The potential effects of the spatial order of the new colony towns was suggested by the comments of Prakash Tandon, whose father was a Roorkee graduate and whose family moved in the early twentieth century from the old city of Gujrat to the new colony town of Sargodha, the chief market of the new Jhelum colony. Sargodha, Tandon wrote, was “planned, well laid out and had plenty of light and air. Its streets and lanes were wide and straight.” But the contrast with Gujrat was social as much as physical. “Somehow,” Tandon noted, “the clean, hygienic, impersonal layout seemed to mould the population into the pattern the settlement officer of the late Victorian period must have had in mind. There was more social and political awakening in Sargodha; its municipal affairs were better run; its communities had started new schools. The singing and dancing girls were moved out of the city, first near the canal bank and then still further away.”⁶⁸ Controlling disorder—moving dancing girls out of the city just as one sought to shift manure piles out of the village *abadi*—was the key to creating new kinds of men to fit into a larger system of bringing order to nature. Indeed, the image of moral order and cleanliness suggested by Tandon’s vision of Sargodha was the same image that many colonization officers had in mind for the canal colony villages whose produce filled Sargodha’s markets.

The Canal Colonies and the Village

Yet, for all the emphasis on such social transformation, the older vision of the village as defined by genealogy was hardly abandoned. British policy with respect to the role of the village in canal colony settlement suggested the deep ambivalence surrounding the canal colonies’ political implications. The vision of the colonies as a transformative space, defining a commonality of community between the state and the irrigators, was a powerful one. And yet the attachment of the British to the village community as a stabilizing “natural” frame of political ordering remained a powerful force, as well.

This was a view of the village not just as a physical space that could be managed for purposes of social transformation but also as a legal space with deep roots in colonial law and policy. It was an image defined by a different “natural” environment: the environment of blood. Even men such as Popham Young, who were deeply committed to the idea of the colonies as a transformative physical environment, held firmly to a deeply ingrained vision of the Punjabi village as an entity defined fundamentally by the ties of custom and genealogy shaped not only by history but also (as we have seen in earlier chapters) by long traditions of government policy. Within this frame, the very word “villager” carried meanings in tension

with the image of a new colony man. As a “villager,” the colonist was embedded not in a transformative community of environmental transformation mobilized by engineering science but in a local community defined by the inescapable power of blood.

It is hardly surprising in this context that the actual processes of canal colony settlement were marked by sharp social and political contradictions. From the very beginning, colonization policy had shied away from any notion that a stable rural society could be constructed in the colonies simply by encouraging the migration and resettlement of individuals in new colony spaces (however central the productive individual was to the discourse of social transformation). On the stabilizing importance of preexisting “village communities,” most British officials were quite clear. As the lieutenant-governor, Sir Charles Aitchison, observed in 1885 with respect to the Sidhnai, without such local communities, defined in law by ancestry and patriarchy, rural stability could not be easily achieved. “A manly peasantry,” he wrote, echoing the standard British patriarchal view of the village, depended on the settling of colonists “under leaders of their own in complete village communities of cultivating yeoman lessees, who will gradually grow into proprietors.”⁶⁹ The importance of this became all the clearer with the subsequent settling of the Chenab colony. In a telling admission, the government had at the very beginning made clear that the process of Chenab colony settlement was to be in keeping with “the tradition of the Punjab as a country of peasant farmers. No other general frame of society,” it declared, “is at present either possible or desirable.”⁷⁰ And what made a “peasant,” of course, was his embedding in a particular sort of genealogically based village community. In settling men in communities modeled on those of the central Punjab, the British tried to maintain a framework that many saw as critical to the stability of their rule.⁷¹

Whatever the implications of the manipulation of colony space, village space thus came to the colonies already loaded with meanings. As Dobson wrote in 1915 in summing up Chenab colonization, the importation of settlers from central Punjab had been “coupled with a determination to introduce only practiced agriculturists of approved antecedents and to found, in so far as might be, none but healthy rural communities of the best type.”⁷² “Healthy rural communities,” was, of course, a phrase that could be interpreted in multiple ways by different officials. For some, these were communities defined by new models of order and regularity, linked to the larger hydraulic system. But the phrase “approved antecedents” suggested another underlying vision. For Dobson, as for many others, even agricultural skill, perseverance, and efficiency—key attributes in adaptation to the new colony environment—were, for most colony migrants, heavily dependent on inherited “tribal” characteristics. Sikh Jats (or “Hindu” Jats, as they were commonly called at the time) and Arains were thought to be the best cultivators, based on deeply held British assumptions about the power of blood in shaping agricul-

tural aptitudes and attitudes. As Dobson summed up the situation in his final settlement report on the Chenab colony: “The tribal composition of the body of grantees in an assessment circle is a matter of the first importance in estimating its capacity to pay revenue: there are variations in soil and inequalities in water-supply, but the strength or weakness of a circle ultimately depends on the agricultural character of those who hold the land.”⁷³

As Dobson’s language suggests, religion was an important element in such calculations as well, as it also shaped “healthy rural communities” and their connections to agriculture and the land. Most colony villages had their own “mosque[s] or dharmshala[s].”⁷⁴ But in the context of colony settlement, officials generally saw religion as in no way separate from the local genealogical community that lay at the heart of the British property order. Though religion had the *potential* to provide a framework for cultural change (indeed to become a vehicle for the individualizing cultural and moral transformations that some saw as inherent in the new ordering of nature marking colony space), this was not how most British officials looked at the role of religion in the colony context.⁷⁵ It was part and parcel of ancestral community. Even as they held out a vision of the culturally transformative power of the colony environment, most officials saw religion and local tribal organization as mutually reinforcing and closely intertwined.

British efforts to adapt the village to a new structure of environmentally based power and community thus reflected ultimately the deep contradictions in their own thinking—and, on the ground, these contradictions took many forms. One dramatic example was in the relations between colonists and village “menials,” or kamins. In some respects, the structure of the colonies promised to transform the relationship between landholders and subordinate classes. Contrasts with central Punjab were in some ways striking. In central Punjab, the legal subordination of kamins to “village proprietors” was one of the most clear-cut markers of the colonial legal conception of the village community. The kamins’ exclusion from and subordination to the village proprietary body was marked in much of the Punjab by their lack of shares in the village commons. In the colonies, however, there were no village commons in the usual administrative sense. State control of the land, and of the common grazing square (or charagah) meant that there was no sharp legal line of demarcation between proprietors and kamins inscribed on the land through shares in the commons. In fact, in the interest of attracting kamins to new colony villages, the British decided early on to set aside one or two squares of (state-owned) land in each Chenab colony village to be opened for cultivation by kamins.⁷⁶ The economics of the new colonies, where kamins were in high demand, suggested the potential for a more open relationship between kamins and settlers within the new environmental framework of the canal colonies.⁷⁷ This was an arena in which the colonies opened up possibilities for significant social change.

Yet, in direct counterpoint to this, the British took a number of steps—both spatial and legal—to reinscribe central Punjabi notions of the subordination of

kamins to the village “proprietary body” onto the canal colony village. Initially, no special arrangements were made in colony sites for the controlled residential settling of kamins. But, in the name of order, this was soon changed. As Dobson noted, “[W]ithout some organized scheme of allotment, these persons would have swarmed promiscuously round every abadi, reproducing the squalour and congestion of the old homes, which it was the ambition of the Colony officers to avoid.” Here was language redolent of the British concern for open, sanitary villages. But the “remedy” for this was not a plan that assimilated kamins to ordered colony space in the same way it did ordinary colonists but one that underscored spatially their social subordination to the colonists who received land allotments. New site plans in the 1890s included “separate quarters” for menials at the edge of the village abadi. Subsequently, British concern for the spatial separation of kamins intensified; “menials,” as Dobson later argued should be “completely isolated and provided with tanks and *chauks* of their own.”⁷⁸ The point of this was not simply to underscore the subordination of kamins but to reinscribe the distinctions of tribe, caste, and ancestry that defined the village “proprietary body” even onto leased colony lands. Kamins were thus given access to cultivation on special village squares, not through an open land market but rather at the sufferance of the collective body of village allottees, even as they were rigidly excluded from receiving (or purchasing) regular allotments of colony land themselves.⁷⁹ The result, as Ali puts it, was that “physical representations of the hierarchical ordering of society were impressed upon the subaltern classes as comprehensively in the canal colonies as they had been in former habitations.”⁸⁰ Perhaps most noteworthy, the distinction between land allottees and kamins, though in fact preeminently one of class and occupation, was reproduced in the colonies not as part of a new class-based social order but as one largely defined and discussed, like village community elsewhere, in the language of tribe, caste, rights, and blood.

Similar considerations operated in the realm of landed inheritance, where assumptions of patriarchy underlay all visions of social transformation. In the early years of settlement, many colonization officers assumed that colony settlement would require some critical modifications in Punjabi customary law, particularly as it related to “tribal” patterns of landed inheritance. Protection of colony allotments from fragmentation was critical to the larger patterns of colony development, and colonization officers generally saw this as requiring careful oversight of patterns of inheritance on colony leases. Concerns about land fragmentation even led in some cases to the approval by colony officers of the passage of leased land (in violation of common patterns of customary law) to unmarried daughters. But such concerns soon came into conflict with the ongoing political interest of many officials in using law and genealogy to stabilize colony villages and assimilate them to larger patterns of village organization found elsewhere in the Punjab. Nowhere was this clearer than in the administrative decision to order the prepara-

tion of “records of rights” in village administration papers (*wajib-ul-arz*) in the newly settled colonies (including the important genealogical tables), just as they were elsewhere in the Punjab. Some officials, of course, balked at this decision, questioning what “ancestral” customs and rights there might be in newly settled colony villages. But such questions were quickly answered by those who urged that customary practice should simply be determined by the “ancestral” practice of the villages that colonists originally came from, supplemented by the emergence of new customs.⁸¹ As such records were drawn up, most colony villages were thus assimilated, in spite of occasional court challenges, to the inheritance practices shaped by the “customary law” of the Punjab. As the Colonies Committee later noted: “Since about 1899,” it had been “the practice in the Chenab Colony to grant mutations [in matters of inheritance] in accordance with the customary law of the parties concerned, reference in all cases of doubt being made to the districts of origin.”⁸²

Customary law was built, of course, on the fundamental assumption that social organization based on “tribal” genealogy defined the patriarchal essence of the Punjabi villager, or peasant, as a particular type of man. The village defined legally by “custom” was a morally gendered, genealogical entity, shaped by a natural environment of blood and kinship. Once again, as in the case of *kamins*, this suggested the deep tensions in colony policy. In the case of women, too, there is much to suggest that the new environmental structuring of the colonies opened up new possibilities for social transformation. Although changes in the roles of women precipitated by new forms of colony agriculture have been little studied, some research suggests that shifts toward highly commercialized, irrigated agricultural production tended generally to create new divisions of family labor and new opportunities for women, and it is likely that this was the case in the Chenab colony.⁸³ Nor can one discount the implications of new structures of colony space in defining new public roles for women. But for many British officials, the transfer of customary law to the colonies presupposed the continuing social power of patriarchy as an inescapable attribute of the very meaning of being a “peasant” or “villager.” As much as any other policy instituted by the British, the continuing reliance on customary law thus suggested the deep-seated contradictions in British efforts to incorporate the village into a new vision of the Indus basin as an engineered hydraulic environment while maintaining a patriarchal image of the “village,” linked closely to the structure of British law and British rule.

VISIONS OF ENVIRONMENT, VISIONS OF COMMUNITY

The reality faced by new settlers in the colonies was thus complex and conflicted. Many responded readily to the opportunities the colonies offered for commercial

production and higher incomes. They participated in an agricultural system that became, as M. Mufakharul Islam has put it, “one of the most market-oriented in the whole of Asia.”⁸⁴ To this extent, many colonists were fully willing to become partners with engineers, as one Sikh author said, in “man’s conquest over nature.”⁸⁵ For his part, Darling wrote admiringly of colony migrants in 1920s, describing in detail one village (Chak 208) that he took to be typical. “Good seed is obtained from the farm in Lyallpur, and a large number of modern implements are in use. . . . All through the village there is an atmosphere of development.” Indeed, “In less than a generation,” Darling wrote, the Jat Sikh had made “the wilderness blossom like a rose.”⁸⁶ In such views, the colonists had taken their places alongside engineers in a community defined by the conquest of nature.

Yet, however much the new regularities of the British hydraulic system—and of the spatial order of the colonies—may have drawn irrigators into new and broader visions of environment and community, they also subjected them, in a far more immediate sense, to new and often increasingly intrusive forms of state control. Many met these new forms of state intrusion with suspicion and resistance. Engineers, of course, justified this intrusion not only in the name of science but also in the “interests of the whole community,” a community now defined by the dictates of efficiency and equity within a large and interdependent hydraulic environment. But, though many irrigators may have benefited from these policies, they also experienced the realities of new British policies in quite contradictory terms. If the British defined new horizons in the control of nature—and therefore productivity—their policies also often limited in many critical ways the direct local control of irrigators over the productive environments of which they were most immediately a part. This was, arguably, linked to the persistence of a special vision of state authority tied to control of the “waste,” even as colony “wastelands” were now being productively transformed.

It was little surprise in these circumstances that, even while adapting readily in many ways to British spatial structures and irrigation reforms, many people in the new canal colonies sought levers to resist new developmental pressures. Most important for understanding the future of the canal colonies is understanding the terms in which such resistance frequently developed—that is, in the language of popular “rights” and ancestral “customs,” often powerfully linked to notions of “ancestral” or “village community.” Given this language, some British officials tended to cast irrigator resistance to increasing state pressures in the canal colonies as evidence of continuing peasant conservatism and backwardness, thus putting colony officers squarely on the side of “modernity” and villagers on the side of what the British called “tradition.” “Disaffection,” as one official put it, “was but the price of efficiency: in creating, or attempting to create, ideal conditions the Colony officers found themselves at variance with public opinion, which expressed itself emphatically in favour of ancestral custom.”⁸⁷ But appeals to “ancestral cus-

tom” were hardly a product just of (or even primarily of) peasant conservatism; they were also an invocation of the moral principles that had long helped to legitimize British law and administration—and thus a frame for “peasant” empowerment within the ideological structure of the colonial regime itself. It was, after all, the British themselves who had insinuated these principles into canal colony settlement policies in myriad ways. In this sense, appeals to “ancestral rights” allowed colonists to play on the contradictions—and the opposing frames for appeals to community—shaping colonial modernity itself.

Indeed, irrigators sought to maximize their leverage by setting one moral appeal to nature against another, with the natural “rights” derived from the logic of blood and local community (which the state itself had of course long since recognized) set against the moral logic of efficiency derived from the large-scale modeling of nature’s productive powers for the control of “waste” and for the “common good” of the community at large. As E. P. Thompson’s evocation of a “moral economy” among the poor in eighteenth-century England has shown, popular resistance to new state pressures was most powerful when it turned the state’s own, protective moral language to its own purposes, playing on the fissures in the state’s languages of legitimation.⁸⁸ This was now clearly the case in the Punjab.

Irrigator resistance to the state was thus intimately tied to contradictions within the legitimizing ideology of the state itself, which played themselves out in debates over irrigation policy within the government in the first decades of the twentieth century. In some ways, these can be traced back to the same tensions between statute and custom that shaped irrigation policy in the wake of the 1873 Canal Act. But they gained new meaning and urgency with the rise of the new hydraulic and environmental visions heralded by the opening of the canal colonies. Though these conflicts found their most pointed expression in the canal colonies, they echoed all across the Punjab in these years—from the old inundation canals of southwestern Punjab, to the Bari Doab canal in central Punjab, to the canal colonies themselves. They made manifest, for officials and irrigators alike, the larger moral conflicts faced by the colonial state as it sought to define political foundations for a new developmental alliance between state and engineer.

Some of these issues crystallized most clearly on old inundation canals. This period was one of considerable stress in seasonal canal management as new pressures for “efficiency,” arising from visions of the river basin as a whole, collided with older forms of control. New engineering imperatives were a factor in the abolition of the *chher* system of unpaid canal labor in the early twentieth century, however deeply this issue was embedded in far older debates about “custom” and statute labor on canals. But broader reforms on these canals led to a wave of irrigator petitions in the first decade of the twentieth century, complaining not only about limitations in water supply consequent on *chakbandi* operations and the

reduction of outlets (for reasons of efficiency) but also about the loss of local control by “leading irrigators” and local canal panchayats over water distribution and canal management following the chher system’s abolition.⁸⁹

For engineers, these reforms were linked to the same larger imperatives that drove the canal colonies—that is, the need to subject these canals to new forms of engineering management in the interests of linking them into the larger Indus basin water system. But many irrigator petitions tended to focus precisely on their own loss of control (and on the loss of local knowledge) intrinsic to the very processes of assimilation that engineers stressed. As the Multan deputy commissioner put it, the zamindar “objects to be linked up on a large system as under this he is entirely at the mercy of the department officials, he can do nothing to supplement a bad supply, nor has he information in time to adjust his cultivation to the supply of water available.” This was echoed by another Muzaffargarh official: “The zamindars have been accustomed in the past to have a considerable say in the methods of irrigation and thus strongly dislike being deprived of this by amalgamation of large canals and closures of small ones about which they have not been consulted.”⁹⁰

What gave these complaints importance was that they were picked up by many civil officials and pressed in internal administrative debates, about which irrigators were apparently well aware.⁹¹ While differences between engineers and revenue officials focused on many technical aspects of irrigation management, the larger moral tension between “custom” and “efficiency,” and between conflicting conceptions of state relationships with the environment and community, ran underneath the debates as a critical subtext. Even as irrigators petitioned the Irrigation Department, some local officials thus wrote spirited defenses of the irrigators’ customary rights, identifying past custom as a foundation for irrigator claims against the government within the irrigation system. In taking this position, some officials overtly cast themselves as “*amicus populi*” (friend of the people), suggesting the larger issues of moral legitimation that were involved.⁹² “Of theory,” the commissioner of Multan, W.R.H. Merk, observed, the people “know nothing.” But far more important than scientific theory in the operation of inundation canals was a respect for existing customary rights. The people had had “rights” in irrigation “from time immemorial,” Merk declared, and if these were taken away, then, at the very least, compensation had to be paid. In underscoring the moral and legal foundations of state recognition of customary rights, he thus challenged the power of a technical environmental vision to justify a complete reorientation in the long-standing foundations of the state’s moral relations with the people (in which he, like many officials had, of course, an important stake). “The Irrigation Department has been and is acting as the London County Council would,” the commissioner declared, “if it were to proceed now to lay out London afresh, after the plan of a city constructed in the prairies, and without concern for the rights and wishes of

the existing householders.”⁹³ Nothing less than the consent of the people in their government was thus at stake.

Such challenges were of course met by many engineers with frustration and, in some cases, virtual incomprehension. That new forms of irrigation management precipitated some complaints was not a surprise, and many engineers were sympathetic to this. But the focus on custom and on rights as deriving from “time immemorial” reflected, in the view of many, a fundamental misunderstanding of the very nature of scientific water management, not just by irrigators but by many British officials themselves. Effective management required constant adaptation to changing conditions, not just to the developing “regime” of each channel but to the changing pressures of water supply in inundation canals as part of the larger Indus basin system. “The point that is so difficult for the man who has not made a speciality of irrigation engineering to understand,” wrote one engineer, “is the constantly changing conditions with which we have to contend” and the concomitant need for ongoing technical adaptation to keep the larger irrigating “machine” in order.⁹⁴ To allow certain irrigators to continue to take more than their share of water, or to put stop-dams in channels to improve their supply—based on the claims of “ancient custom”—was, as they saw it, not just a challenge to existing statute (for such actions were clearly subject to government regulation under the terms of the Canal Act) but also a threat to the most basic principles on which they were building the irrigation system. As the chief engineer, W. B. Gordon, wrote, “no improvements are possible without some interference with existing conditions, interests and customs.”⁹⁵ This was the lesson taught by a scientific understanding of nature.

Yet beyond even this, many engineers saw rationalization of canal management as itself rooted in moral principles no less compelling than the recognition of “custom.” In the words of E. S. Bellasis, a Cooper’s Hill graduate, the large owner had formerly “had control of his own and his neighbour’s water. Now things are changed.” To hold up custom as a principle in support of inefficiency and inequity was simply to preserve, he argued, an “old, corrupt and wasteful system” that, however popular, was “unrighteous in itself.” Science, the structure of the larger natural environment, and utilitarian theory all dictated otherwise, pointing toward the primacy of the common good. Bellasis echoed Merk’s London analogy in dramatizing the implications of official opposition to needed reforms. “What would be said if people, when municipal rules and such like are introduced anywhere, were encouraged to kick against them on the ground that their ancient customs are being interfered with?”⁹⁶ Progress would be impossible. The debate among officials thus drew irrigator complaints into a larger and more fundamental debate among officials themselves on the legitimate power of the state to remake the environment, and nature, as a foundation for a new developmental order.

Such tensions were equally in evidence in controversies surrounding the remodeling of channels on the Bari Doab canal in central Punjab in the years just

before and after the turn of the century. Here village communities were far more important than in southwestern Punjab—indeed, this canal ran through a region that had provided many settlers for the Chenab colony. The place of village communities in irrigation management on the Bari Doab had drawn the attention of administrators from the canal's earliest days. But, once again, reforms intended to tighten up channel control (in the interests of extending irrigation and establishing greater systemic equity in distribution) provoked strong resistance based on a defense of customary rights. The need for periodic remodeling of canals had become central, according to the theory of canal "regimes," to established engineering doctrine. Remodeling normally required the reduction in size of the outlets serving villages near canal heads in order to allow more water to reach the tails as a canal's "regime" matured. Otherwise, engineers were forced to order the periodic closure of outlets (*tatils*) near the heads of canals in order to force the passage of water to the tail, a practice distasteful to engineers and many irrigators alike.⁹⁷

However, villages near canal heads often bitterly resisted remodeling reductions on the grounds that, after long usage, this water was now their community's *haq abpashi*, or irrigating "right," a term that for many carried strong customary moral resonances (echoing the earlier efforts of the British themselves to record such *Haquq-i Abpashi* in varying contexts). As one Sikh landowner in Lahore district later put it: "[From] more than 70 years ago, we are using this water and it has become our right now," and, whatever the engineering justifications for reductions during canal remodeling, "it would be a great injustice if we are deprived of this right."⁹⁸

Once again, of course, such claims gained force and significance precisely because they played into the debates among the British themselves—and because many British officials took very seriously the moral claims to resistance that they engendered. At the heart of this debate was the very meaning of *haq*, or "right," a word long used by the British administration but also one with old and deep roots in moral discourse, originally derived from Arabic. This was a word widely used in irrigation management, but for engineers it had a very specific, technical meaning, signifying the percentage of the commanded culturable land on an outlet that the Irrigation Department agreed to irrigate as it was planning new irrigation works. Scientific calculations of an outlet's "haq" were thus, as engineers saw it, highly contingent and based, in theory, on technical conditions within the village (or *chak*) and on the water available within the larger system.⁹⁹ In its very nature, as canal engineers saw it, the "haq" had thus to be modified in response to changes in a canal as it reached its "regime," and in light of the need to equitably deploy water along canals and among the system's commanded lands. For engineers, it was thus linked inescapably (at least in theory) to a concern for equity and efficiency among the (environmentally defined) community of irrigators as a whole.

But the term also had deep roots in a very different administrative discourse that not only galvanized many officials but also seemed to legitimize the resistance to the increasing intrusion of state power that engineering reforms implied. Within this discourse, *haq* referred to rights determined by long usage and custom, which were rooted in the same principles of past practice and ancestry that structured the “village community” and customary law. Many British officials thus criticized engineering attempts at remodeling and outlet reduction on the Bari Doab from an early date, emphasizing the need for the protection of “vested rights,” as some officials put it, a key element in maintaining the stability—and moral political foundations—of British power. This led to the government’s formulation in 1901 of what were known as “Haq Rules,” which were intended as a compromise formula to allow rights to be protected even as remodeling went forward. But the working of these rules—and subsequent attempts to modify them—simply provided fuel for ongoing controversy and for an administrative debate that continued for decades. Some officials came to see the very word *haq* as a problem because of its multiple political resonances. As James Douie, the settlement commissioner, wrote in 1906 in connection to water supply in the Chenab colony, “[I]t is a pity that the misleading word ‘haqq’ ever came into use.” The efficient distribution of water was a “matter . . . in which it is essential that Government should have a perfectly free hand.”¹⁰⁰ Yet disputes about water “rights” continued. To sidestep the problem, some engineers suggested replacing the word *haq* in official usage with the word *hissa* (or share), which was more contingent, reflecting the proportional relationship between the parts and the whole that was central to scientific thinking. But this word, too, was ultimately rejected on the grounds that its popular and administrative usages were no less deeply rooted in the language of village community (and “ancestral shares”) than *haq*. Instead, the Punjab chief engineer directed simply in 1910 that engineers substitute the phrase “permissible area” for “haq” in official documents.¹⁰¹ In spite of this, the word *haq* persisted in irrigator discussion of water supply long afterward as, in the words of one report, a “popular and erroneous designation.”¹⁰² This was, of course, precisely because it fit into an empowering rhetoric of resistance to increasing state control that invoked the state’s own principles.

The Protests of 1907

All of this provided a backdrop to the significant movement of resistance to government policies that erupted in the Chenab colony in 1907. The movement was focused on more than simply water issues. Canal protests in 1907 were linked to broader challenges to British rule during this era, encompassing urban, Indian National Congress, and Arya Samaj protest against a range of British policies in the Punjab.¹⁰³ Nor were irrigation protests confined to the canal colonies. Indeed, among the most outspoken critics of British policy at this time were the very Bari Doab irrigators who had protested for many years against canal remodeling

policies and the concomitant interference with “rights.” In 1907, these complaints were linked to protests over British proposals to rationalize water pricing on the Bari Doab by significantly raising water rates, which galvanized unprecedented levels of public criticism of the government. But the most serious protests, at least from the British perspective, were from the canal colonies, and they had focused on the passage in 1906 of a new Colonization Bill, which crystallized debate on the fundamental developmental principles on which the canal colonies were based.

At the heart of this Colonization Bill was the British concern to strengthen state control over processes of production in the Punjab and, in the process, to underscore the new model of state-controlled, environmentally based development of which the colonies were both the chief example and the chief symbol. The bill was prompted by government concern to neutralize a rash of legal cases that seemed to threaten the full exercise of state discipline over the colonies, particularly with respect to the government’s ability to impose fines on cultivators to enforce residence requirements, rapid development of village homesites, nonwasteful usage of water, and “proper” village sanitation. These were matters of discipline central to the new developmental vision of the colonies and had always been assumed to be within the Colonization officer’s prerogative. But in the face of several court challenges, the government had discovered after 1900 that it lacked statutory authority under the Colonization Act of 1893 to enforce such fines.¹⁰⁴ To make clear the critical role of executive authority in the colonies, the bill thus barred the civil courts in the future from hearing such cases, thus underscoring a moral foundation for canal colony authority that transcended the old structure of colonial law. Beyond this, in order to prevent the fragmentation of holdings in the colony (which was critical to efficiencies of water usage), the bill limited the application of the regular law of inheritance (including customary law) on colony holdings more generally. The underlying assumptions behind the timing of the Colonization Bill were later summed up by Dobson with surprising bluntness: “The year 1906 mark[ed] an epoch in Colony administration,” he wrote. “By this time the purely beneficent stage was past: it had become necessary to enquire how far conditions of tenure had been complied with, especially the conditions as to residence; [as] pressure had been brought to bear on recalcitrants the work of colonization entered upon a phase as distasteful to the Colony officers, as it was vexatious to the people.”¹⁰⁵

Yet the weaknesses in the government’s position were underscored by the protests the measure sparked. These derived primarily from two sources. First, the government’s position in asserting a new model of development linked to state environmental management was seriously compromised by the ongoing limitations in the colonies of the very structures of state environmental control on which new moral claims to government power theoretically rested. Far more than else-

where in the Indus basin, settlement in the colonies was entirely predicated on state control over an integrated technical system for delivering water.¹⁰⁶ If there was a common sense of community linking engineers and irrigators, it rested on this. And yet, much protest in 1907 focused precisely on the difficulties that the Irrigation Department still faced in effectively delivering adequate and timely water supplies to individual colony chaks as part of a larger hydraulic environment. Problems in effective deliveries to canal tails had been a problem from the very beginning. The years before 1907 had seen increasing attempts by engineers to tighten up distribution in the colonies by reducing supplies to some outlets (particularly near distributary heads) and more carefully controlling and regulating distribution to others, all of which was necessitated by the filling out of settlement on commanded lands in the colony. As the Colonies Committee later noted, in the early years of irrigation, with the soil still “hot” and holdings not properly broken up, large supplies of water had been necessary.¹⁰⁷ But with “regimes” and “duties” stabilizing, cutbacks in water delivery increasingly undermined irrigator confidence in the system. These problems were exacerbated by emerging problems of waterlogging and salinity, which forced the government to implement new supply rules in many areas that contravened earlier British commitments.¹⁰⁸ Opposition to the enforcement of government rules—and to the Colonization Bill—thus hinged in significant part on a growing lack of irrigator confidence in the government’s basic ability to deliver on its own technical environmental vision.

More important, such problems were compounded by the Irrigation Department’s ongoing reliance on a corrupt lower-level bureaucracy for the measurements and reports necessary for state action in effectively controlling supply. Reliance on lower-level officials exacerbated irrigator dissatisfaction with the irregularity of water supply, even as it increased irrigator resentment at the often arbitrary and corrupt levying of fines for violation of settlement rules and conditions. Irrigator complaints of favoritism and expense were thus common and increasing in volume in the years leading up to the Colonization Bill. Ironically, the state’s vision of technical and scientific environmental control seemed to depend, in the end, on local bureaucratic interactions that had little apparent relationship to the environmental and engineering principles that justified the tightening of state control and intervention under the Colonization bill.

Added to this, of course, was the seeming abandonment in the Colonization Bill of the discourse of “custom” and “rights” as a legitimizing foundation for the state’s authority. In barring the courts from jurisdiction and in seeking to limit the operation of customary inheritance in the colonies (all in the name of creating a more efficient system), the bill seemed to challenge the very levers that the British themselves had earlier recognized in negotiating with colonists. It was little wonder that, as Dobson noted, “it came as a rude shock to the majority to learn that Government proposed to apply with the full weight of official authority

regulations that now seemed to be an infringement of customary law and practice.”¹⁰⁹

Not surprisingly, irrigators in the colonies, as elsewhere, fell back largely on the colonial discourse of “rights” to resist this proposed expansion of state control, accusing the state of having reneged on its own undertakings. The protests of 1907 were led by the editors of the recently founded *Zamindar* newspaper and by several prominent colonists who formed the Bar Zamindar Association to press the colonists’ grievances. Numerous mass meetings were held in the Chenab colony to protest the Colonization Bill, particularly along the Gugera branch where, as Gerald Barrier notes, “harsh residency and sanitary regulations as well as water scarcity had cut most deeply into the colonists’ faith in British intentions.”¹¹⁰ Much of the rhetoric focused on government oppression (*zulum*), particularly on issues of rules and fines. Opposition to government was linked by some (such as the Jat Sikh leader, Ajit Singh) to a stress on maintaining in these circumstances the “honor” of the Jats through resistance to a state that had, as he argued, broken its own undertakings.¹¹¹ This was grounded in an ideology of property-holding rights that had been nurtured by decades of colonial rule. Honor (or *izzat*) was of course a concept closely linked to the morality of “tribal” community and blood, but it was also one deeply embedded in an ideology of village property-holding linked to proprietary village communities.¹¹² While many of the more wealthy zamindars associated with the Bar Zamindar Association proposed more limited protests, Ajit Singh sought to mobilize Sikh Jat communities in the colonies to act in concert, proposing a refusal to pay water rates and social ostracism from local communities for those who refused to join the protest. The high point of the movement came with a public meeting in Lyallpur city in February 1907 that attracted an estimated 10,000 people.¹¹³ The size of this protest—and its connections to and support from some urban Punjabis—led some government officials, including the new lieutenant-governor, Sir Denzil Ibbetson, to see the agitation as a threat to the very structure of British rule.

The fissures within the government itself, however, soon became evident. While some bought into Ibbetson’s arguments that these protests were part of a larger challenge to British rule linked to the Congress, “urban pleaders,” and the “seditious” partition agitation in Bengal, others noted that the complaints surrounding the Colonization Bill could be just as easily interpreted in terms of long-standing moral grievances intrinsic to irrigation policy, a position with which, as we have seen, many British officials themselves had considerable sympathy.¹¹⁴ Indeed, the deep-seated nature of the internal divisions in the British position were reflected in the extraordinary character of the ultimate British response to the colony agitation. Although many officials were, as usual, adamant in their unwillingness to appear to yield to a “seditious” agitation (which some linked even to the threat to British rule from the Russians), the appeal of colony

protestors to moral principles associated with irrigator “rights” led the central government to recognize the internal stresses facing the government of Punjab and to ultimately propose a retreat that would underscore the state’s commitment to what some saw as critical legitimizing principles. After much internal debate on how to respond, the government of India decided finally to take the highly unusual action of repudiating the Colonization Bill and refusing to grant its assent to the Punjab legislation. While rejecting the “political” demands of the (largely urban) Congress that had been linked to the 1907 protests, the central government essentially ordered the Punjab government to reconsider the fundamental issues that had sparked the colony protests.

In the aftermath, the Punjab government appointed a high-level Colonies Committee to inquire into irrigator grievances in the canal colonies. The report of this committee (chaired initially by Sir Thomas Gordon Walker and then by D. C. Baillie) retreated expeditiously from the principles of the 1906 Colonization Bill, which, in light of the protests, it now considered ill-advised. But its report also crystallized the political contradictions in the role of the state—and in its relationship to the environment and local communities—that lay at the very heart of irrigation and colonization policy. Since that time, some historians, most notably Imran Ali, have seen the Colonies Committee report (much of which was enacted into law in the Colonization Act of 1912) as a watershed, marking a politically motivated retreat from the commitment to “agricultural development” that motivated earlier British policy. The larger developmental vision that had marked the expansion of professional engineering and the settlement of the canal colonies on state lands was, he suggests, largely abandoned by the Colonies Committee in the wake of the 1907 protests. The aim of colony policy became instead the assimilation of the colonists into the larger peasant-based and law-based developmental order of colonial Punjab, an assimilation that was closely linked to—and symbolized by—the expeditious awarding to colony settlers of proprietary land rights, perhaps the most important recommendation of the Colonies Committee. By accepting the inevitability of the award of proprietary rights, “the state,” in other words, Ali argues, began after 1907 to forfeit its “role as an agent of innovation.”¹¹⁵

This seriously overstates the case. Whatever the compromises that shaped the report of the Colonies Committee, in reality no full retreat from the developmental policies of the canal colonies, or from a scientific view of the environment, was possible. The new engineering view of the Indus river basin that had shaped colony development had come to stay. That the Colonies Committee report represented no outright rejection of state-led, technicalist development was evident in the fact that the report (and the passage of the 1912 Colonization Act) did nothing to limit the vast expansion of expansion of irrigation on state lands marking the opening of the Triple Canal project and development of other projects that

followed. Indeed, once the Chenab colony and Jhelum colony settlements were complete—and plans for the Triple Canal in train—there was no going back on the larger engineering vision that the canal colonies represented or on the larger environmental view of an integrated river basin.

The committee itself made this clear. While showing sympathy with the claims of customary rights, the members declared their unequivocal opposition to any system that would “surrender the right of Government to use the water to the best advantage in the interest of *the whole community*. Their recommendations have throughout been made in the hope that nothing that they have said will encourage the wasteful or handicap the economical use of water.” And if individual irrigators could not be assimilated to such a view, then state authority would have to serve. Powers “to punish the unauthorized use and waste of water,” they noted, “are very necessary at all stages of the development of a colony canal for the protection of the majority against the selfish few, as well as for the proper working of the canal. A cultivator who takes water out of his turn or wastes water is injuring some one else.”¹¹⁶ This was a vision in which efficiency, not custom, was paramount, and it was rooted in a conception of the colonies as a transformative and interconnected water environment. The committee held out the hope that the already completed stages of colony development, with their emphases on embedding colonists in a world of regularity and discipline, would eventually help to transform irrigators themselves—and “have abiding results in the habits and customs of the descendants of the first colonists.”

Yet by strongly recommending the expeditious movement toward the awarding of proprietary rights in the colonies—firmly within the framework of village settlement and “village community” that had already been established—the Colonies Committee also underscored the moral claims of a very different vision of “rights” and development. For whatever the larger environmental vision that defined the canal colonies, the committee report made clear the political importance that the government still attached to a discourse of rights and genealogy embedded in the proprietary ancestral village. In this sense, the committee itself understood clearly the larger implications of its recommendation that colonists be allowed to acquire proprietary rights. “No considerable body of persons have in northern India ever held directly under the British Government otherwise than as proprietors,” the committee declared, “and it has become an ingrained and cherished belief that this status implies security of tenure and moderation and justice in regard to the revenue demand.” The law—and most particularly property law—was, by implication, the source of the strongest moral bond linking the state and the people. The settling of colonists on former state “wastes” in no way justified the withholding of proprietary rights, once the instruments of production were in place, even if they were provided by the state. This was the lesson, they implied (though they did not directly say it), that the colony protests of 1907 had made clear.

However, the committee recognized that property law did more than supply simply security of individual tenure. The law also defined a form of community that continued, in many respects, to be in tension with the larger, environmentally defined visions of social order linked to the transformation of the hydraulic environment. For the committee, the inescapable link between the recognition of proprietary land rights and the simultaneous recognition of the primacy of local, “tribal” community was underscored by its emphasis on the need for the full restoration of the operation of “customary” inheritance law. The exclusion of daughters from landed inheritance was, in this framework, at the heart of “ancestral” community, far more than any concern with regularity, order, and sanitation. As the committee saw it, fear of the undermining of “customary” succession rights held by collaterals (in preference to daughters, which was at the legal heart of the idealized meaning of “village community”) had been one of the main concerns that had led to the 1907 protests.¹¹⁷ The restoration of customary law was thus a key, in their view, in underscoring the government’s recognition of the customary “rights” and assumptions that bound the state to the people. Patriarchy, one might say, was the ground on which government and people met. Even as the committee appealed to a broad image of community defined by environmental interdependency, it reasserted, again, a powerful moral bond between the government and the (male) “peasant” as a foundation for political stability (even if this bond provided potential moral leverage for resistance to the very rules that the state’s larger environmental vision demanded).

The link between environment, community, and morality was evident in the committee’s harking back to “ancient custom” in its references to the relationship between proprietary right and the reclamation of waste. According to custom, “the reclamation of waste and unappropriated land is recognized throughout northern India as giving a title to proprietary rights,” the committee noted, “and in giving lower rights Government will be open to the charge of conceding less than is due by ancient custom.”¹¹⁸ This was, of course, an argument intended to answer critics who saw the awarding of rights as compromising the state’s transformative environmental mission. But the reference to the rights of “ancient custom” reflected a political calculation—and a recognition that the state’s political position could not just rest on its claims to fully control the hydraulic environment of the Indus basin (which had, in any case, been called into question in the 1907 protests) but would also continue to depend on its ability to control (and manipulate legally for political purposes) another natural environment in the Indus basin: the environment of blood, kinship, and tribal community. When the chief recommendations of the Colonies Committee were thus passed into law in 1912, they crystallized the contradictions that already marked British irrigation policy. As the conflicts of the early twentieth century suggested, the new model of “development” represented by the alliance of state and science—and by the new, integrated conception of the

productive environment that this produced—remained in tension with an older vision of the relationship between the state and local communities, with far-reaching implications for the history of the Indus basin.

CONCLUSION

The impact of a new vision of a wasteful nature demanding man's disciplined shepherding of water to "command" the land for productive purposes thus wrought profound changes in the Indus basin in the decades after 1890. This empowered a systematic vision of the Indus basin as an integrated hydraulic environment that required new forms of state control over water, land, and people alike. The result was a series of great new engineering projects vastly expanding the scope of irrigation. In the eyes of many engineers, the form of these projects was dictated by the ineluctable imperatives of science and nature. This is why, as the Punjab *Manual of Irrigation Practice* later put it, many engineers conceived of themselves as "content to let their achievements speak for themselves." Politics were in principle rigidly excluded from the ostensibly disinterested science of engineering calculations, even as this attempt to model nature underscored moral claims to power.

Nevertheless, the new systems of hydraulic control instituted in these years, culminating in the opening of the canal colonies and in the audacious Triple Canal project, had critical political implications for how the state related to the people. This took many forms. As historians have long noted, land grants in the canal colonies were used in a variety of ways as political rewards, including for military service. Indeed, canal colony planning was integrated with the needs of the military in broader ways, as Ali has made clear.¹¹⁹ But the mobilization of science and techniques to transform nature inevitably implied a new vision of power as well, one of community binding society and state. And critical for politics was how this new vision related to the local structures of community and "blood" that had come to be so important to colonial statecraft.

Central to the history of irrigation in this period, as it had been from the very beginning, was the structure of property—that is, of the way that society gave legal form to control over nature. For some, new visions of the environment promised a way to sidestep questions of property, offering direct powers to the state based on new levers of technical control of the environment. This is what empowered the large-scale canal colony settlement of irrigators on newly opened state lands. But the politics of property were so deeply embedded in the structure of colonial power (and thinking) that issues of "proprietary rights" intruded into the structure of the canal colonies (and into all new irrigation systems) almost from the beginning. Perhaps most critically, property in the Punjab (as in every society) was not simply a legal structure of individual or corporate rights but carried in its particularities

deeply held notions about the very nature of the individual and his or her relationship to the definition of communities.

It is little wonder in this context that the political meanings of the great new perennial irrigation projects of the Indus basin were, almost from the beginning, bitterly contested. The protests of 1907 and their aftermath left indelible implications for the subsequent history of the politics of irrigation in the Indus basin. The conceptual structures that defined the colonial response to these protests shaped the history of water in the Indus basin to partition and beyond.

The River Basin and Partition

It would be profitless to attempt to allocate [the responsibility for the partition boundary]. The task was impossible of accomplishment in the time available. But I am only a technician. Water follows immutable laws of nature. Man makes his own laws as he goes along—and immediately breaks them. I prefer water.

—A. M. R. MONTAGU, CHIEF ENGINEER, PUNJAB, 1943–47¹

One day, Bakhto, the midwife, who came to check on Jeena every day, brought the news that the Indians were going to “close” the river. Jeena didn’t know what that meant so she asked Bakhto, “What do you mean by closing the river?”

Bakhto answered, “They will close the river that waters our crops.”

Jeena thought for a minute, then laughed and said, “You talk like a mad woman. . . . Who can close a river; it’s a river, not a drain.”

—SAADAT HASAN MANTO, “YAZID”²

The period following 1920 was one of rapid environmental and political change in the Indus basin. The next thirty years brought the development of electoral politics, economic upheaval during the great depression, nationalist challenges to British rule, and the end of the colonial regime in 1947. Perhaps most dramatically, it also brought the partition of India into two separate states, India and Pakistan, which split the Indus basin, and its structures of water control, in two. Many of these changes were rooted in historical pressures originating in distant areas. Yet the political and environmental legacies of Indus basin water development were inescapably linked to all these events—for, from the 1920s onward, the relationship between environment and community in the Indus basin came to be a central ground on which the distinctive authority of the state itself in the region rested.

With the structure of engineering control over the Indus rivers already well on its way to producing the largest integrated system of river basin irrigation in the world, the region had in some respects come to resemble what Karl Wittfogel termed a “hydraulic society.”³ That is, its revenues significantly rested on a highly

bureaucratized system of water control, supplied to large quantities of wasteland initially owned by the government, and this system played a determinative role in shaping relations between state and society. Though most intensive in the Punjab, this system of perennial canal irrigation expanded significantly during these decades to encompass a good part of Sind as well, particularly after the opening of the huge Sukkur barrage scheme in the early 1930s. This expansion was also linked to various engineering advances in this period toward greater control over the Indus as a modeled water system.⁴ At the heart of this lay the policy, first clearly enunciated by S. L. Jacob at the turn of the century, of using engineering to bring the maximum possible quantity of land in the region under canal “command,” thus integrating the land into a river basin-wide system driven by the dynamics of waste and efficiency. As the *Report of the Food and Agriculture Commission of Pakistan* noted many years later, the aim of the colonial irrigation regime that came to fruition in this period was not to maximize production per acre but to maximize the number of acres under irrigation “command.” The goal was to “cover the maximum acreage per cusec of water rather than to get the maximum yield per acre.” The result was a system that was intentionally built to embody water scarcity, spreading water “thinly and widely” in order to maximally underscore the centrality of engineering and bureaucratic authority to the operation of the system.⁵

This system had multiple consequences, not least the settling of large populations into a position of significant dependence on a state-controlled environment. Once started, there could be no retreat from this, for without large-scale irrigation this population could not be supported. But this was hardly a period of simple bureaucratic domination in water matters, for it was one defined by new—and conflicted—forms of water politics, linked not only to these new environmental and administrative parameters but also to the political aftereffects of the water protests of the early twentieth century. The new politics of this era operated on multiple levels. For example, the period was marked by new forms of bureaucratic competition among the many administrative units—provinces and princely states—that made up an increasingly technically integrated Indus basin water delivery system. It was also an era in which the interconnections between this technical system and new forms of provincial politics—rooted in the colonial politics of provincial devolution and elections—became increasingly clear. Relations between local and provincial politics were undergoing significant change. Even as the Indus basin system thus bound provinces into an interlinked community of production, provinces also became the focus for new forms of provincial identity, drawing on the local forms of “natural,” kinship-based community that were so powerful in the localities.

The development of new frameworks for the intersection between competing visions of community—defined by men acting together upon nature versus nature acting upon men to define their distinctive identities—thus marked the politics of

the Indus basin in this period. This pointed toward the coming of the critical new forms of identity-formation associated with nationalism, which led ultimately to the single most important event of the twentieth century in the region: the partition of the Indus basin in 1947 between India and the new state of Pakistan, a product ultimately of new forms of “national” imagining. Although the emergence of nationalism had multiple roots in the Indus basin in the mid-twentieth century, forms of “national” imagining were deeply shaped both by the technical structuring of the Indus river basin and by the different forms of community relationships to nature that were embedded within the colonial administrative and revenue system. The distinctive imaginings of the “nation” that emerged in the region—in relationship both to the integrated river basin environment and to a partition that ultimately split the Indus basin in two—were to have a profound impact on the subsequent evolution of water control in the Indus basin in the decades following 1947.

A SYSTEM OF MANY PARTS

The years between 1920 and 1947 marked a key period in the emergence of the Indus basin as an integrated system of many interconnected—but also potentially competing—parts. Central to this development was the acceleration of water development in Sind, which was part of the Bombay presidency before 1936 and had shared relatively little in the late nineteenth and early twentieth centuries in the Punjab’s rapid irrigation expansion. Whereas the total irrigated land in Sind and the Punjab had been roughly equal in 1880, by 1920 the Punjab had close to three times Sind’s irrigated acreage.⁶ The causes for this imbalance in irrigation investment were many, but at the heart of the disparity lay the fact that Sind had given relatively little attention to perennial canal building and continued to rely overwhelmingly on its extensive network of inundation canals. In fact, the idea of a high-level perennial canal system taking off from a barrage at Rohri had first been broached by J. G. Fife in the first comprehensive report on Sind irrigation in the 1850s.⁷ But it was only in the early twentieth century, particularly after the sanctioning of the Punjab’s Triple Canal project, that worries about the potential effects on Sind’s inundation canals of the Punjab’s large canal colony withdrawals led to the formulation of a concrete proposal for a Sukkur barrage scheme, as much to protect Sind’s existing seasonal irrigation as to follow in the Punjab’s footsteps. This was submitted to the secretary of state for India for sanction in 1910 and was initially rejected in 1912 on technical and financial grounds. But the project was reformulated and pressed once again in the early 1920s. Sanction was finally given in 1923 for the construction of a huge perennial canal system in Sind taking off from a barrage at Sukkur, a project that finally opened in 1932. The opening of the barrage scheme led to significant increases in Sind’s annually irrigated acreage

and cash-crop production—and to a more comprehensive view among most engineers of the Indus basin as a single water *system*.⁸

The water needs of the Sukkur barrage project, particularly in competition with a series of new canal projects in the Punjab, became the subsequent focus in the 1920s and 1930s of escalating interprovincial water disputes. The project was, in terms of scale and total miles of canals built, the largest of all the Indus basin projects of the colonial era, though it focused less on the opening of new “waste-lands” than on providing a more reliable water supply to seasonally irrigated lands. By the time of its final sanction in 1923, the Punjab had already begun work on the Sutlej valley project, based on an agreement between the Punjab, Bahawalpur, and Bikaner states for sharing waters to be taken from a series of new barrages on the Sutlej (a project foreshadowed even in the planning of the Triple Canal project). Four barrages (Ferozepore, Suleimanki, Islam, and Panjnad) were constructed in the next decade, which commanded over six million acres of cultivable land from both perennial and nonperennial canals on the Sutlej.⁹ The simultaneous construction of the Sukkur barrage and Sutlej valley projects during these years thus dramatically heightened concerns about water availability as a systemic issue (see map 7).

The result was a new era of water politics in the Indus basin, defined by a series of increasingly acrimonious exchanges between the provinces and the center over water allocations. The integration of the Indus basin within a built environment of water scarcity was reflected in a new emphasis on the collection of statistics about interconnected water flows, which emerged as central to these negotiations. An Indus Discharge Committee to monitor flow and collect statistics was established in 1921 by the inspector general of irrigation, Sir Thomas Ward, which issued reports that attempted to gauge the impact of Punjab withdrawals on Indus flow at Sukkur. Although these reports were hardly fully conclusive, they proved critical when escalating conflict led the Central Board of Irrigation in 1934 to appoint an engineering committee to report on the distribution of the waters of the Indus and its tributaries, the Anderson Committee. Relying largely on these statistics (which proved of “utmost value and importance”), the Anderson Committee came up with a set of proposals for water allocation that were initially accepted by the Punjab, the North-West Frontier Province, and Sind (which became a separate province in 1936) and by the states of Bahawalpur, Bikaner, and Khairpur.¹⁰ Superficial agreement was reached and orders were passed by the government of India to implement these proposals in 1937, but a series of disputes remained between the Punjab and Sind relating to the planning of future projects—which hinged significantly on the reliability of the water statistics that were collected.

At the root of continuing conflicts were both the yearly and the seasonal variabilities in flow (which defied the clear statistical fixation of water allotments) and

the difficulty for the Anderson Committee in delineating the principles on which “equitable” allocation might occur. The committee, though declining to lay down general rules of allotment (and focusing on allocations relating to specific questions of dispute), nevertheless emphasized principles of “equity” rooted in the same engineering vision of environmental control that had driven the engineering parameters of canal colony development in the early decades of the twentieth century. Referring to the stated, general policy of the government, the committee framed its approach in classic utilitarian terms: though the members had found it impossible to propose comprehensive rules “for the allocation of water between claimants,” they were nevertheless guided by “the general direction of the Secretary of State, namely, that in allocating water, the greatest good to the greatest number must be sought, without reference to political boundaries.”¹¹ In accord with this, they proposed that no agreements could confer permanent rights, for if circumstances arose “justifying the reviewing of an agreement which is no longer equitable,” then that agreement would be open to modification in keeping with changing conditions.¹² We can see here the old tensions between the competing political principles long evident in the discourse of the colonial regime—the one linked to custom and “prescriptive rights,” rooted in past practice, the other linked to a vision of systemic “equity.”¹³

Beyond this, the very structure of the framing of these water disputes in terms of competing units defined by provincial and state boundaries made it difficult to define any fully technical framework for assessing systemic “equity.” This was partially a product of the impossibility of fully incorporating the huge variation in regional and local conditions into a single vision of irrigation defined by the maximization of water’s productive use. Although the productive value of water to individual producers lay (in theory) at the core of a utilitarian vision, in practice the committee made no serious attempt to fully equate the assignment of specific volumes of water with any measured, productive return or benefit—for, given the wide variations in local conditions in the Indus basin, this would have been virtually impossible.¹⁴ Indeed, it was further complicated, as the committee recognized, by the effects on output of growing problems relating to waterlogging and salinity, which were still not fully understood (and will be further discussed in the next chapter). Given these constraints, the committee made its recommendations simply with respect to water allocations to particular political units (provinces and states), which had the discretion under the committee’s recommendations to distribute their allotments as each “deems fit.”¹⁵ This was presented as a pragmatic decision, a compromise rooted in the argument that projected shortages would be minimal, but it offered little principled foundation for a meaningful definition of an “equitable” allocation.

The political implications of this became clear with the quick, subsequent breakdown of the agreements embodied in the Anderson Committee report and

by the appointment in 1941 of another committee to assess Indus basin water allocations, the Indus Commission (or Rau Commission). This group's appointment was prompted by a complaint from Sind within the new frame of provincial autonomy in water matters that had come with the 1935 reforms. Sind's complaint now asserted that the water statistics used by the Anderson Committee were flawed and that shortages in the system would be substantial (particularly in the rabi season). Sind therefore raised objections to allocations for the Punjab's Thal and Haveli projects. But the heart of their complaints related to the Punjab's planning for the new Bhakra dam on the Sutlej, which, as the region's first large storage dam, carried critical implications for the further development of the whole Indus basin system.¹⁶ Sind's engineers argued that the Bhakra dam was likely to have serious consequences for Sind, both in its kharif season effects on inundation canals (when the question of water availability at the beginning and end of the irrigating season was critical), and in its rabi season effects on water supplies available to the Sukkur barrage canals when water flow in the system was at its lowest. Unlike the Anderson Committee, the Rau Commission (led by Calcutta High Court justice B. N. Rau, joined by two engineers) took a more judicial approach to the conflict, and they used an extensive review of the law of interstate water disputes elsewhere to develop a clearer definition of the meaning of "equitable apportionment." Rau recognized from the beginning that disputes between states as established political units had a distinctive international legal history. He thus offered a lengthy review of cases in the United States, where the case law on interstate rivers was most developed, and argued in general terms for a linkage between the recognized doctrine of "equitable apportionment" in American interstate cases with the legal doctrine of prior appropriation, giving priority to first use so long as it did not harm overall development.

However, the Rau Commission too operated on the engineering assumption that the technical logic of an integrated river system environment ought itself to dictate the common, community interests structuring water negotiations. As Rau noted, ideal international practice (as embodied in early twentieth-century river basin conventions) suggested that "the most satisfactory settlement of disputes of this kind is by agreement," driven by "the parties adopting the same technical solution of each problem, as if they were a single community undivided by political or administrative frontiers."¹⁷ At the heart of the parties' relations was thus, once again, the engineering vision of a common "community" of productive interests dictated by nature itself (rather than "political" boundaries) and driven by engineering's power to maximize water's use and minimize water's natural tendency to "run to waste." Rau could not resist noting, in discussing interstate legal agreements on the Colorado river in the United States, that four times more water was annually "being wasted to the sea" from the Indus system than the entire yearly flow of the Colorado—thus implying the *common* engineering challenge uniting

the Punjab and Sind in trying to turn this water to “use.”¹⁸ At the same time, in adjudicating shortages (which were seasonally significant), Rau was far more attuned than the Anderson Committee to the importance of the emerging constitutional/political structures in which India’s provinces (and princely states) were embedded, particularly in the wake of the 1935 Government of India Act. Provinces were defined not just by their place in an environmental structure but, even more important, by their place in the new political-legal structure of provincial autonomy and by the terms of the 1935 act, which gave them autonomy to develop their own water resources, subject only to complaints with the center filed by other adversely affected provinces. This provincial autonomy in irrigation matters was reflected in the largely adversarial character of the Rau Commission’s proceedings, which were in many respects more like those of a court than the mediation of an overarching technical authority.¹⁹

Under provincial autonomy, technical issues were, of course, potentially subject to pressures of provincial politics—and to new political visions of community—quite different from those defined by the engineering contours of the river basin. Indeed, engineers were themselves hardly immune from the political pressures implicit in this new political/legal structure. Although many engineers prided themselves on an apolitical ethos dictated by science—on the cultivation of a normative “scientific and technical temperament,” as one Indian irrigation engineering textbook later put it²⁰—they were employed within provincial bureaucratic hierarchies that had their own distinctive self-images and cultural identities. Competing self-images among Punjab and Bombay engineers (and civil administrators) were already evident in the early 1920s as they mustered their cases against one another in arguments pressed on the central government. Bombay engineers in the years before Sind’s separation had at times criticized the Punjab’s engineering obsession with expanding irrigation to encompass *all* available “wastelands,” seeing this as a kind of arrogance that transcended the realistic constraints of the Indus basin environment. During the 1920s, the Bombay government had thus labeled the Punjab’s proposed Thal project as nothing more than “a financial speculation for the exploitation of a wilderness,” a sacrifice of Sind’s plans to bring perennial irrigation to existing cultivators “in order to exploit a desert for the benefit of the speculator.”²¹ The Punjab’s engineers, for their part, tended to project a vision of Sind as backward, a region that had been slow under the authority of Bombay to take up the latest breakthroughs in engineering science. They thus chafed at what they saw as an emerging pro-Sind bias in the central government after 1920, which could be read as seemingly punishing the Punjab for its previously more enlightened, activist transformation of the Indus basin, now reflected in its vast canal colonies. “The Punjab came early into the field, when the introduction of perennial irrigation in Sind was still a matter of controversy and discussion,” one Punjab official wrote. “The Punjab must not now be penalized for the energy and decision it has shown.”²²

At times, competing cultural images of the Punjab and Sind, which also had some popular currency, crept into the very language of technical discussion. Perhaps the clearest example of this was found in the debate surrounding the fixing of water “duty” for the Sukkur barrage scheme. The duty of water, as discussed earlier, defined the quantity of water necessary over a fixed period of time to bring crops in a particular area to maturity. It was thus a critical element in projected water requirements and canal design for particular projects and, as a result, in debates on water allocations. But, though a technical measurement in project planning, the calculation of duty hinged not only on local cropping patterns and climatic conditions (such as rainfall and temperature) but also on the cultural practices (and “wastefulness”) of the irrigators themselves. The fixing by Bombay engineers of low levels of duty for the Sukkur barrage project, particularly during the rabi season—which was central to projection of the project’s water “needs”—thus became an important bone of contention with engineers from the Punjab, and one that seemed to hinge at times on the comparative cultural development of the Punjabi and the Sindi peasant. Punjab engineers attacked the setting of low Sukkur duties as an attempt by Sind to claim more water based, at least in part, on the very backwardness of Sindi irrigators whom Bombay engineers themselves had failed to expose to the transformative spatial and moral frameworks that had marked the Punjab’s canal colony irrigation. To now reward them with more water for this was, seemingly, an inversion of progress. Some Bombay engineers responded defensively, arguing that Sind irrigators would need time to learn “to use the water much more economically than they have done in the past under the inundation system.” But most chafed at the underlying assumption that Punjab irrigators were somehow more “advanced” than those in Sind, arguing that the Sukkur duties were in fact, given Sind’s extremely low rainfall, not substantially lower than those in the Punjab.²³

That such engineering arguments might readily intersect with emerging rhetorics of provincial identity in the politics of the Punjab and Sind during this era should come as no surprise. But the relationship of technical and environmental issues to the politics of provincial identities was complex. Without doubt, the opening of the Sukkur barrage played a critical role in debates on Sind’s separation from Bombay as its own province and thus in the construction of a “Sindi” political identity. For opponents, the debt burden of the barrage, which Sind would be hard-pressed to meet on its own, was a critical argument against separation, while for supporters the modernizing power of the barrage represented a strong argument for Sind’s right to take its place as a separate province. And yet, throughout this debate, the practical implications of barrage irrigation were still ambiguous. However potentially important the Sukkur barrage was as an impetus for the transformation of the Sindi peasant, in practice the reactions of Sind’s dominant landholding classes to such transformations were decidedly mixed. The need to

generate high returns from the barrage canals led to pressure on land revenue assessments that at times provoked significant landed Sindi opposition. Perhaps most ironically, the same pressure for high returns led to the policy of settling Punjabi immigrants on a portion of newly opened barrage lands, on the argument that they could more readily pay the higher necessary rates, a practice that was resented and yet demonstrated the new pressures the barrage had created.²⁴

Provincial Politics, Water, and the Punjab Unionist Party

The most significant development for water politics in this era lay in the larger reformulations of provincial identities that shaped politics in the era of provincial elections after 1920—and the ways these intersected with the politics of irrigation. New structures of provincial politics, culminating in the introduction of provincial autonomy under the 1935 Government of India Act, mirrored the vision of an interconnected system of multiple parts that shaped river basin development. Provinces were given increasing control, through elected councils and assemblies, even as they were bound within a larger structure of law and administrative control. In matters of irrigation, the deliberations of the Rau Commission had reflected this new structure. But newly emerging provincial identities—shaped both by new structures of politics and by the deep contradictions within the colonial administrative regime—were also marked by the new meanings given to the local idioms of “natural” community associated with biradari and blood as they gained new significance within larger structures of provincial politics and identity formation.

Nothing illustrates this more clearly than the emergence of the Punjab Unionist Party in the decades after 1920 as the dominant political party in the Punjab. The party originated in the new, elected Punjab Provincial Council in 1923. As noted by H. J. Maynard, a high British official, property interests dominated the concerns of the average rural representative in the new council; these were men who were “impressed,” as he put it, “with the necessity of keeping tenants and labourers in their proper places, very jealous of rights of property.”²⁵ But property holding as a foundation for Unionist politics and ideology was given a distinctive cultural turn in this era by the colonial state’s own earlier policies. The key to this was the Punjab government’s passage of the Land Alienation Act in 1900. The terms of the act had captured the long-standing juxtaposition in colonial administrative policy of two contrasting visions of community tied to property interests: one composed of property-owners as a self-directed economic class of producers (such as was embodied in the utilitarian framing of Indus basin engineering); the other defined by the operation of blood in shaping property-owning communities linked to “tribe” and biradari as the foundations for political stability in the localities. The act sought, in a sense, to reconcile these conflicting visions of community by using the term “agricultural tribes” to define a single, protected “class” of landowners whose lands could not by law be alienated to those outside that class (whether

nonagriculturist moneylenders or village kamins).²⁶ The structure of the act thus transformed the term “agricultural tribes” into both a class category (shaped by common property interests) and a cultural category, reflecting the continuing political primacy of genealogically based “natural” communities among landowners in rural Punjab. It was this framework that the Unionist Party tapped into as it projected itself as a provincial spokesman for the Punjab’s property owners, both as a dominant rural class and as a provincial party with cultural claims to rule the Punjab.

This provided the foundations for a unifying provincial ideology as the Unionist Party coalesced to compete for power in the 1920s and 1930s within the new Punjab provincial councils and assemblies. This is not to say that the party was without significant divisions, some of which arose from the contradictions in the colonial property order and the framing of the Land Alienation Act itself. In mobilizing the category “agricultural tribes,” the Unionists appealed to an image of commonality (and equality) rooted both in the honor and autonomy of the individual property holder and in the local bonds of “tribe” and biradari community. But with a firm connection to the protection of property, the party was largely built on local structures of inequality and patronage. Agrarian conflict was particularly intense in parts of the Punjab during the 1930s, and Unionist landlords, who had in some cases received large land grants from the British in the canal colonies and were at times themselves moneylenders, were targets of considerable agrarian attack (though perhaps not so much as the government’s land revenue policies and in some cases the Irrigation Department’s water rates).²⁷ Nevertheless, protests against rising indebtedness tended to bring Unionist landlords and other “agriculturist” proprietors together against a common “nonagriculturist” enemy in these years, a fact reflected in the popularity of the Unionists’ provincial program of anti-moneylender legislation in the mid- to late 1930s.

Most significant, however, was the Unionists’ evocation of the colonial state’s own appeal to “custom” as a foundation for political stability and authority that provided a framework for keeping bureaucratic authority at bay in local contexts, even as the party remained deeply attached to the structure of British law and authority. This emphasis showed the Unionists to be, in a sense, the political inheritors at the provincial level of the compromises with the British that had emerged out of the canal protests of 1907. Even as they remained strongly committed to the ongoing, state-led expansion of irrigated agriculture in the Punjab (from which most Unionist leaders had economically benefited), their mobilization of local patronage and biradari ties provided a counterweight to bureaucratic pressure at the local level, which drew sustenance from the conflicted structure of the colonial regime itself.²⁸ But what was most significant about the Unionists as a provincial party was that they drew the vision of local, genealogical community, defined by custom, which had been so critical to the colonial political structure,

into direct juxtaposition with the engineering vision, defined by statute, of rationalized, active control over nature. The arena of provincial government thus emerged as the locus for the conflicted intersection between these two legitimizing visions of community in critical new ways.

The tensions to which this gave rise perhaps can be most clearly highlighted in the significant influence among the Unionist leadership of descendants of the old nineteenth-century water lords. In a sense, the Unionists had emerged as a powerful provincial presence precisely at a moment when the old tension between statute and custom in water management was on the verge of being definitively resolved in favor of statute, with “private canals” being gradually subsumed within a still-expanding technically and bureaucratically managed perennial canal system. At the same time, the introduction of elected provincial councils seemed to put a new type of premium on the distinctive political styles that water lords had embodied. They were men who had balanced a hard-headed interest in technical water management with the pressures of local “tribal” identity and biradari politics that were now critical to electoral politics. Not all the leaders of the Unionists came, of course, from such backgrounds. Neither the founder of the party, Sir Fazli Husain, nor his successor as Unionist leader in 1936, Sir Sikandar Hyat Khan, came from families with histories of local canal construction. But the prominence of the families of nineteenth-century water lords among the Unionist leadership is striking, including leading members of the Noons and Tiwanas of Shahpur, the Daultanas of Multan (who had gained influence by constructing a nineteenth-century canal, the Ghulamwah, from the right bank of the Sutlej), the Mamdots (who had patronized canal building in Ferozepore), and the Legharis of Dera Ghazi Khan. Their influence points clearly toward the new forms that the old tensions of colonial statecraft took as they were, in a sense, scaled up to the provincial level.

The political roles of these families in the new era of elected provincial governments were thus framed by the old, conflicted history of late nineteenth-century British efforts to balance the political imperatives of “custom” with the larger, rationalizing mandates of the Canal Act, now confronted in new form. On one level, as we have seen, many engineers and officials had come by the twentieth century to see custom as the antithesis of rationalized canal administration, thus defining the expropriation of water-lord canals as an unambiguous sign of scientific progress (and a marker of the Punjab’s “progressive” image in irrigation development). Yet, on another level, even as these canals gradually came under direct state control, the political style of leadership represented by these families survived as a complex legacy of the contradictions built into the colonial property regime—now given new importance by the structures of devolution and provincial autonomy marking the post-1920 era.

The tensions between “custom” and “tribe,” on the one hand, and appeals to bureaucratic “efficiency,” on the other, can be seen in the specific histories of these

canals as their fates were debated within the context of this new order. The story of the Hajiwah canal in Multan, the large inundation canal that had been the subject of the Khakwani family's suit against the secretary of state for India at the turn of the century, provides a case in point. The Khakwanis had won proprietary rights over the bed and banks of the canal in the Privy Council decision of 1901, suggesting the critical importance of the Punjab's property rights discourse, even in relationship to water control. But, as we noted earlier, the short-term result of the decision was only to open a series of protracted negotiations concerning the meaning of this decision for the Hajiwah canal's actual operation, negotiations in which the government's right to manage the canal in the interests of "efficiency" (and a vision of community defined by the supposed "common good") was balanced against the government's simultaneous political interest in recognizing and maintaining property rights and the irrigation of the Khakwani family and, indeed, a structure of patriarchal, biradari-based local authority. The underlying problem in these negotiations was thrown into sharp relief by the British proposal in the 1920s to incorporate the Hajiwah canal and its lands into the larger command of the Pakpattan canal, a part of the new, perennial Sutlej valley project (see maps 5 and 7). The question then arose as to whether it was appropriate to grant the Khakwanis special rights to water *within* the new perennial system as a form of compensation, recognizing their continuing local influence and their history as water lords.

This, of course, reflected British recognition of the critical, continuing tension between bureaucratic irrigation management and the maintenance of the stabilizing local political influence of families like the Khakwanis, which had taken on all the more significance with the introduction of elected provincial councils. But the Irrigation Department was now clear that the formal recognition of special water rights within the larger structure of perennial canal administration ran contrary to the most basic principles of water administration. As a senior official, J.D. Penny, noted in 1925, "[I]f land is available I would rather give land here than water, if one or other is necessary in order to improve relations between Khans and the Government for the future," for the political recognition of local influence (still a critical need for the colonial state) was far more easily reconciled with the principles of the property order than with those of the expanding structure of bureaucratic engineering.²⁹ The idea of a technical discourse of water engineering that *ought* to stand apart from politics was as old as the debates over "tribal" influence in Dera Ghazi Khan canal operation in the middle of the nineteenth century, and it had only gained in significance and had been recognized in the Canal Act. But, in discussing the place of these former water lords in the Sutlej valley system, Sir Herbert Emerson (soon to be governor of the Punjab) made clear that such a separation of principles could hardly capture the full reality of local influence within such new perennial canal systems. Though

“the formal sanction by Government of preferential treatment is a different thing,” he said, “I have no doubt that the Khans, being rich and powerful owners, will in the sequel obtain a better supply than their poorer neighbors,” even within the new system.³⁰ Emerson’s comments suggested how the formal principles of large-scale irrigation could hardly override the structures of local influence still embedded within (and, indeed, officially recognized within) the landed property order. The principles of the larger irrigation order were recognized as antithetical to the principles of local political influence, but most officials (including engineers) recognized that these principles continued to operate in the management of water beyond the departmentally controlled canal outlet almost as if this was a separate realm.

The tensions inherent in such a separation emerged starkly in British negotiations with the private canal owners of Shahpur district, notably the Tiwanas and Noons, who, unlike the Khakwanis, themselves became important political leaders at the provincial level in the Unionist Party during these years. Although some British officials had long been concerned about the special rights of these leaders in local irrigation (and about the resentment their influence over water generated among some local irrigators), in this case, political considerations ultimately outweighed concerns about their relationship to the larger, engineered structure of the canal network and the visions of “equity” it contained. The British had moved as early as 1906 to seek the incorporation of these private canals into the larger, perennial, canal colony irrigation system with the construction of the Shahpur branch of the Lower Jhelum canal (see maps 6 and 7). But technical questions surrounding the Shahpur branch—and the potential costs of compensation to the “private” owners of these canals—delayed the issue for almost a decade, and, for a time, construction was halted on the branch. It was only in 1915 that a decision was finally made to go ahead with the branch and begin negotiations with the “water lords” for expropriation and compensation. Frank Popham Young then put the case to local canal owners starkly, offering not only significant compensation but appealing to the owners on ideological grounds, stressing the importance of the incorporation of these canals, and their owners, into a larger provincial system of values based on more efficient and scientific production: “Apart from your own interests, I am confident,” he wrote, “that you will agree in thinking that the Shahpur district must not continue to put up with an out-of-date and makeshift system of irrigation, when a scientific distribution of the available water supply on modern lines can be effected. We must all work to secure the greatest good of the greatest number.”³¹ Here, a utilitarian vision of “modern” integrated irrigation, based in “efficiency,” was mobilized not only to draw these canals but also their owners and patrons into a larger vision of common community.

Nevertheless, negotiations with the owners quickly bogged down in the water lords’ refusal to accept the monetary terms offered by the government, constrained

by what was required to make the completion of the Shahpur branch financially feasible. Indeed, the government's political solicitousness for these local families had increased within the contexts created by World War I and the role of the Tiwanas in army recruiting. The political importance that the British attached to these leaders was suggested by the comments of the lieutenant-governor, Sir Michael O'Dwyer, in 1914. "They are at present water-lords over a considerable tract of country, a position which gives them considerable prestige and many advantages, the loss of which must be considered in determining the compensation to be paid. . . . Sentiment plays a large part in these matters," O'Dwyer noted, and should "be taken into account."³² Recognizing not only the financial value of the canals but also the "very much valued position of water lords in a large tract of country," the British thus found themselves unable to come up with a settlement that would meet the needs both of local influence and of the financial constraints of the Shahpur branch's construction.³³ As a result, the Shahpur branch was not completed until after 1947, thus leaving the local positions of these leaders as water lords intact, even as some (most notably Sir Firoz Khan Noon, who was later to become prime minister of Pakistan, and Malik Khizr Hyat Khan Tiwana, later Unionist premier of the Punjab) became prominent provincial Unionist Party leaders.³⁴

The political history of these water lords thus provides a clue to the complex pressures on community and identity defining the juxtaposition of a new order of elective representation against the ongoing backdrop of local tensions surrounding water control within a large engineering system. Indeed, even as the integrated, engineered structure of perennial canals expanded throughout the Indus basin in these years—further marginalizing such locally controlled canals—the cultural style of leadership associated with the water lord, as a man who was attuned at once to both the political economy of irrigation and the cultural imperatives of patriarchy and local "tribal" connection, took on added political significance in the arenas of provincial politics. But the fate of the Punjab's private canals suggested also the ongoing contradictions in such a model, both within the technical structure of irrigation administration and within the new "public" worlds of elective politics. Indeed, the line between the balancing of such conflicting imperatives, on the one hand, and the "corrupt" intrusion of local politics into bureaucratic administration, on the other, was sometimes a fine one.

Problems of "corruption" within the framework of bureaucratic canal management were nothing new in the Indus basin. On one level, corruption could be measured by the degree to which local connections and influence intruded into the management of local water distribution by engineers, a problem common enough in a system in which local-level bureaucratic subordinates were open to myriad local political and financial pressures.³⁵ But, on another level, it was the government's own recognition of the legitimacy of such local "tribal" power and community (a recognition underlying the new culture of Unionist power in

provincial politics) that gave these problems new meaning in the twentieth century, a reality reflected in Emerson's almost offhand admission that, whatever the principles of the irrigation system, the Khakwani khans, "being rich and powerful," were still likely to get more water than their neighbors even as they were absorbed into the new, integrated canal network. While the structure of irrigation management left no formal room for the operation of local, landed, and biradari influence (which could therefore only be seen in the context of "scientific" water management as "corrupt"), it was the colonial state that had itself recognized such influence as central to legitimate landholding, which had in turn structured the emergence of Unionist provincial power.

A reflection of these tensions, both in provincial politics and in local irrigation, can be glimpsed with respect to the problems of water management on the estate of the Daultana family of Multan district during the 1940s. The Daultanas were to become one of the most influential families in the new structures of elected provincial representation. They too were old water lords, owners of the Ghulamwah canal, built by Ghulam Muhammad Khan Daultana of Luddan in Mailsi tahsil in the late nineteenth century, which by the 1920s irrigated nearly 10,000 acres of Daultana land plus a little over 5,000 acres supplied to villages outside it (see map 5). At the time that the Unionist Party was formed in 1923, this canal was under the control of Ahmad Yar Khan Daultana, who was soon to become an important provincial Unionist leader. As a local magnate and water lord, Ahmad Yar Khan's provincial political ambitions had been nurtured by the British themselves (particularly when his estate was under the Court of Wards) precisely to facilitate his taking a role in the new arenas of provincial politics, combining the political skills of a local magnate with the broader perspectives needed for exercise of power at the provincial level. The young Ahmad Yar Khan, as Maynard had written in 1919, was a voracious reader of history and a man with "lots of brains," but Maynard recommended that, if he was to take a role in provincial politics, he also needed to be trained in the management of the estate so that he could immerse himself in the local business of production as a stepping stone to provincial elective office. To be effective in politics at the provincial level, Maynard wrote, Ahmad Yar Khan had to first "take up his position as 'squire,' help the district and, 'qua' the representative of local agriculturalists come forward as politician."³⁶ Subsequently, Ahmad Yar Khan emerged in the 1930s as an important leader of the provincial Unionist Party and a champion of the interests of the "agricultural tribes."

However, the tensions inherent in the intersecting roles of the Daultanas in local water matters and in provincial politics emerged clearly after Ahmad Yar Khan's death in 1940. By that time, the Ghulamwah canal had been bought out by the British in connection with the construction of the new Nili Bar project.³⁷ With the Daultana estate now incorporated into the command of the new, government-run Pakpattan canal, local irrigation officials thus took formal control over the

Daultanas' water supply, just as they had done with the nearby Hajiwah canal. But the continuing influence of the Daultanas as ex-water lords persisted, not only in the locality but now, in an equally telling way, at the provincial level as well. For, by the late 1940s, Ahmad Yar Khan's Oxford-educated son, Mumtaz Daultana, after shifting from the Unionists to the Muslim League in the run-up to the creation of Pakistan, had become a minister in the Punjab provincial government.

The tensions inherent in the situation were suggested by the comments of Bashir Malik, a newly minted Irrigation Department engineer trained at Aligarh, who was posted shortly after partition to the Joya subdivision, where the Daultanas' lands were located. Malik faced immediate problems in dealing with the local influence of the Daultanas. Their agents manipulated local officials regularly through customary gifts (a central element in landed and biradari networks of authority), maintaining in the process their privileged access to irrigation water, even though this was antithetical to bureaucratic rules (and though their days as water lords were technically past). They (or their local managers) were known, Malik thus noted, for regularly "cutting . . . canal banks, tampering with outlets and stealing [water] through unauthorized pipes." As a new engineer, imbued with engineering's ostensibly apolitical values, Malik took pride (at least according to his own later story) in trying to resist such influence, rejecting customary gifts in spite of being told by local people that to do so would "insult" the Daultanas' local "prestige." Instead, he started a case for *tawan*, or unauthorized irrigation, in an effort to uphold Irrigation Department rules. But as Malik noted, the threat that hung over local irrigation officers now was that powerful local landowners could use their influence with elected officials to force their transfer if they ignored "customary" water claims. The subdivisional officer, Joya, he observed, served in effect "at their [the landlords'] pleasure not that of the Punjab governor." This was a problem of particular immediacy since Mumtaz Daultana was himself now a minister in the provincial government.³⁸

But Daultana combined, if often in conflicted ways, the various contradictory imperatives that had long defined both water lords and Unionist politicians (and continued to shape landed Muslim League politicians). When the matter was brought to his attention, Daultana responded, at least according to Malik, by regretting "the misdeeds of his assistant manager" and asking that he be "kept informed" of such "illicit practices." But his position within the provincial ministerial structure suggested the deep tensions increasingly built into this structure, for, as an elected representative at the provincial level, Daultana hardly left the cultural imperatives of local landowning behind. In fact, Daultana's response could equally well be interpreted as an effort to use his provincial position, and his influence over the bureaucracy, to cement his local power by disciplining his own local managers.³⁹

The case illustrated the complex relationship between a vision of provincial interests (and community) linked to the engineering vision of the river basin and

one rooted in the protection of local property, biradari, and patriarchal “tribal” authority. Although the emergence of the Unionist Party in some ways defined a frame for balancing these conflicting principles at the provincial level, the new politics of the twentieth century underscored the ongoing tensions between these principles at both the local and the provincial levels. Daultana’s case also suggested the complex ways in which tension in irrigation management at the local level now tracked tensions defined by the introduction of elective and party politics in shaping the operation of an engineered river basin system of “many parts.” The cultural styles of the old water lords, defined by the balancing of the principles of efficiency and local political connection, lay at the very heart of the culture of the new provincial politician, whose authority in some ways transcended—and in other ways embodied—the lines of “corruption” built into the system.

NATIONALISM, WATER, AND THE PARTITION OF THE INDUS BASIN

Unionist rule in the Punjab came to an end in 1947, a casualty of the emergence of a new vision of “community,” that of the “nation.” The growth of nationalist ideologies was in no way a product of self-contained developments within the Indus basin, for it was linked to broader South Asian—and worldwide—developments. But its particular form was powerfully shaped by the region’s history of environmental transformation and by the forms of colonial statecraft with which it was associated.

Modern nationalism, at least in Benedict Anderson’s influential analysis, is a form of community whose hallmark is the defining relationship between individual autonomy and the larger construction of visions of community. For Anderson, this form of community (that is, one with individual autonomy at its heart) arose preeminently from the practices of print-capitalism and reading, material practices empowering the free imaginations of individual consumers and readers. But the intersection of print-based visions of community with the structuring of the environment gives the history of nationalism in the Indus basin a distinctive twist. In Anderson’s vision, the distinctive character of modern national community lay in its direct linking of the individual to a larger collectivity capable of transcending (through imagination and print) the social constraints of local face-to-face community. But in the Indus basin, this was a form of imagining that also intersected with the history of water control in multiple ways. It was not, after all, simply reading that operated on the individual imagination but the material world as well. In the framework of large-scale, systemic water development, irrigators were embedded within the ubiquitous physical signs of an engineered canal system—from regular, branching distributaries, to regular plots, to regular village plans and settlements. This seemed to dramatize, at least in the still expanding canal colonies,

the individual's incorporation into a community of individual producers defined by a *system* of environmental interaction that transcended the localities—and the forms of community embedded within them. Indeed, the encapsulation of individual irrigators within an ever-more integrated, engineered river basin environment defined a frame for the imagining of a common community of action upon nature, a vision that, though mediated by engineers, had the power to resonate with the structure of new nationalist imaginings as Anderson describes them.

Indeed, the potentially transformative power of new relationships to nature had been well understood by many British officials, and this was why they had sought to channel and constrain such change within structures of bureaucratic authority.⁴⁰ But equally significantly, they had deliberately juxtaposed this transformative power against the more autonomous, culturally “authentic” local communities defined by the “natural” claims of blood and biradari—forms of community that were thereby parochialized but at the same time lent authenticity and mobilized as keys to political stability. Indeed, tribal/biradari identities, as embodied, for example, in customary law and in the Unionist Party, had become almost a form of property, a product of nature operating on each individual to define community identities that could never be *fully* controlled by the colonial bureaucracy. Critically, however, these two forms of community—one shaped by man's action upon nature, the other by nature's action upon man—though they had in some ways jostled together in the provincial ideology of the Unionists, remained in deep moral opposition in the region.

Ironically, given the centrality of “tribal” identities to British administration in the Punjab, it was religion that in the years after 1920 came to provide the most important framework for bringing these visions together—and, in the process, to provide a foundation for new forms of nationalist expression in the region. In part, this was a product of the extension into the region of all-India developments. Separate electorates were extended into Punjab after 1920 for Muslims and Sikhs alike, and religion subsequently played a critical role in providing the moral language for challenges to British sovereignty as increasing power was devolved into Indian hands. But most significant was that, even as religion assumed increasing importance in politics, its form as a moral foundation for emerging nationalisms was distinctively shaped in the Indus basin by the oppositional forms of community that had long structured colonial statecraft—and water control—in the region.

The impact of these opposing forms can be traced through a comparison of the similarities—and differences—in the development of nationalism among Sikhs and Muslims, who made up the bulk of Indus basin irrigators. The framing of oppositional visions of community was perhaps most evident in the history of religious reform in the region. The contrast between the imagining of a “pure” and unified community, defined by self-controlled individual action in the world (both upon external nature and upon one's own inner nature), and a structure of worldly

“natural” communities dictating human difference and status hierarchy was central to the structuring of a wide range of late nineteenth- and early twentieth-century religious reform movements—and ultimately of twentieth-century Indus basin nationalisms as well. This can be seen quite clearly in the case of the Sikhs. As Harjot Oberoi has persuasively argued, late nineteenth-century Sikh reform was suffused with attacks on popular “customs,” whose rejection provided a framework for asserting a vision of community defined by more direct, individualized (and homogenized) commitment to the “purer” principles of Tat Khalsa Sikhism.⁴¹ This was a vision of universalizing moral community that gained traction precisely as it was juxtaposed against the deep-seated parochialism of custom and local biradari, which continued to be so important in the local organization of rural Sikh life.

But the key to the emergence of a distinctly “nationalist” form of religious community in the years after 1920 lay in the ways that these seemingly antithetical and juxtaposed imaginings of community were linked together. As a distinctive form of ideology, Sikh nationalism gained traction from the *linking* of a reformist rhetoric of individual moral action to the language of “natural,” kin-based community—that is, to a vision of Khalsa “brotherhood” (or biradari) that drew on the egalitarian kin-based ethos of “natural” community embedded in Sikh Jat biradari structure. This linking gained significance particularly during the movement for the reform of the Sikh gurdwaras (temples) during the 1920s, which produced a structure of overarching Sikh community built on a nesting hierarchy of local communities, with a central gurdwaras committee (the SGPC, or Central Gurdwara Management Committee) ultimately established at the apex of a network of elected gurdwaras committees across the Punjab, a structure that gained statutory recognition with the passage of the Punjab Sikh Gurdwaras and Shrines Act of 1925. The proprietary Sikh village community, constructed largely in the language of Jat biradari (with all its solidarities and exclusions), came to provide a key foundation, in other words, for a new type of nationalist imagining that found its clearest expression in the emergence in the 1920s of the Akali Party, which tapped into the language of Jat biradari solidarity even as it also drew strength from the individualizing reformist language of individual moral action in the name of the gurus and the Sikh scripture.

An emerging “Sikh nationalism”—like nationalism in many parts of the world—can thus be read as deriving dynamism from its joining together of seeming conceptual opposites. With institutional foundations in the SGPC and the Akali Party, this provided the basis for a range of Sikh mobilizations in the years leading up to partition, including many involving the supply of water to the large number of Sikh communities embedded within the canal colonies and the older Upper Bari Doab canal system. Akali attempts to fuse these forms of community were evident, for example, in organized protests against government canal policies in the 1930s, during which the Akalis organized the coordinated closures of canal

outlets by local chak communities, brought together within a vision of nesting local communities now mobilized by the Akalis in a language combining local biradari solidarity with a reformed vision of Sikh moral collectivity.⁴² This new linking of a language of individual productive entrepreneurship to a language of “blood” was captured by some British authors of this period, such as Malcolm Darling. Writing in 1925, Darling saw the canal colony “environment” as having allowed the Jat Sikh to reach a level of productive “development” unmatched in India. But if this was a vision linked to active conquest over nature, it was one that was tied also to the language of “blood” that had played such an important role in shaping the local colonial political order. “It is as if the energy of the virgin soil of the Bar had passed into his [the Jat Sikh’s] veins,” Darling wrote, “and made him almost a part of the forces of nature which he has conquered.”⁴³

But if we can call this a new Sikh nationalism, such developments were also marked by significant contradictions as partition approached. This nationalist vision of the Sikh community continued to operate in considerable tension with the deep-seated biradari and factional divisions with which it had a strong but ambiguous relationship—and which provided a powerful undercurrent of factional conflict to all Sikh politics in these years.⁴⁴ Even more significant was that this nationalist vision of community could find no widely accepted territorial expression in the years leading to partition since the Sikhs were a majority in no part of the Punjab. Although Akali leaders offered various territorial proposals for a Sikh national state in the negotiations leading to partition, none gained serious consideration. Sikh nationalism remained a vision of community in search of a spatial grounding, a fact that was to have critical significance for its relationship to the environment, as we shall see.

This last point, of course, contrasted sharply with the situation facing Muslims, whose numerical majority in the Indus basin provided the foundations for the actual territorial partition of India and the creation of Pakistan in 1947. If the development of Muslim nationalism in some ways paralleled that of the Sikhs, in other respects there were striking differences. For Muslims, too, the dynamics of national imaginings were shaped by the interactions between differing forms of community, in which relations to nature played an important role. But the image of an active, autonomous, moral individual, cast in opposition to the demands of local “custom,” was even more dominant in late nineteenth- and early twentieth-century Muslim reformism than it was among the Sikhs. Indeed, the pressures of the local worlds of biradari and custom came to represent for many urban Muslims and religious leaders (*ulama*) the internal “other” against which the idea of a sovereign Muslim community was imagined. Many reformists projected the religious law (*shariat*), and particularly the landed inheritance rules of shariat granting rights to women, as the moral antithesis of the Punjab’s worldly, tribally rooted system of “customary law” that had made the exclusion of women from landed

inheritance a central principle, and that had come to be so important for the Unionist Party.⁴⁵

The language of “brotherhood,” and of “natural” community, was in fact never seriously linked by most Muslim reformers to the vision of a “national” community the way it was among Sikhs. Nor did Indus basin Muslims ever experience a movement comparable to the Sikh gurdwara reform movement, drawing local communities shaped by the solidarities of biradari into a larger whole defined by a structure of nesting communities linked to sacred sites. Rather, Muslim nationalism came to have a far different valence. It was characterized in the years leading toward partition by the projection of the Muslim “nation” as a moral *alternative* to the parochialisms of blood and local community that had underlain the politics of the Punjab Unionists.

To delineate this, there is no better place to turn than to the writings of Muhammad Iqbal, whose works shaped significantly the distinctive rhetorical articulation of Muslim nationalism in the late 1930s and 1940s in the Indus basin—and particularly in the Punjab. Iqbal was an explicit critic of nationalism as a form of narrow territorial loyalty.⁴⁶ But he was nevertheless a passionate advocate of a vision of community that framed individual self-assertion and self-realization as the key to a collective consciousness that transcended the “earth-rootedness” of local genealogical ties, thus projecting a form of community—much like Anderson’s imagined nation—built on individual autonomy as the foundation for collective imagining.⁴⁷ Indeed, for Iqbal the image of the active individual as the foundation for an imagined “national” community was cast explicitly as the *antithesis* of a community passively defined by the parochial, “natural” bonds of blood. The affinity between Iqbal’s “reconstruction” of religious thought and the engineering vision of a community rooted in nature’s *active* conquest is striking. “It is the lot of man to . . . shape his own destiny, as well as that of the universe,” Iqbal wrote, “now by adjusting himself to its forces, now by putting the whole of his energy to mould its forces to his own ends and purposes. . . . In this process of progressive change, God becomes a co-worker with [man], providing man takes the initiative.”⁴⁸ These were ideas that would have been wholly congenial to engineers like William Willcocks.⁴⁹ For Iqbal, the key to a mobilized Muslim community was the projection of an idealized Muslim sense of individual self, which he called *khudi*, defined by an almost mystical individual autonomy guided by God.⁵⁰

Yet the implications of Iqbal’s ideas for the structuring of Muslim nationalism were complex, for his vision of Muslim community was, in the words of Naveeda Khan, largely *aspirational*, less a direct challenge to the existing social structure of communities of blood than a call to construct another vision of community on a higher moral plane.⁵¹ This provided the foundation for the Punjab Muslim League’s challenge to the Punjab Unionist Party in the 1946 elections in the name of Pakistan as an embodiment of a Muslim nation. On a rhetorical level, the league

emphasized strongly the moral obligations of each individual to transcend the claims of local “tribal” and biradari structures in the name of an active community of individual commitment symbolized by the establishment of an independent national state. As one of Iqbal’s verses, quoted in a Muslim League election poster, put it:

Whether you are a Sayyid, a Mirza, or an Afghan
Whatever you may be, say also that you are a Musalman.⁵²

Yet, as the league campaigned for votes, it mobilized local support by using the same forms of biradari and patronage power as had the Unionists. This was projected simply as reflecting the pragmatic politics necessary to realize Pakistan’s creation in an imperfect world. Indeed, the Muslim League’s campaign for Pakistan came to operate on two parallel yet seemingly separate planes: one of aspirational rhetoric, and one of local political deal making grounded in the ongoing pervasiveness of landed patronage and biradari ties.

Certainly, there were now some radicals—and leftists—in the Muslim League camp who saw the individualizing frame of nationalist rhetoric as a foundation for challenging this separation, and they called for a thoroughgoing reform of the structure of property holding in the countryside, seeking active social transformation on this basis.⁵³ But politically far more important were the large number of propertied, ex-Unionist political leaders (including the scions of old water lord families like Mumtaz Daultana, Iftikhar Husain Mamdot, and Firoz Khan Noon) who, precisely because of this gap between rhetoric and the structure of local community-based deal making, easily shifted into the Muslim League camp in the mid-1940s as the Pakistan movement developed, embracing an individualistic vision of “national” community on a rhetorical level but maintaining their networks of support rooted in the same landed and genealogically based structures of power on which Unionist authority had long rested. This was facilitated by the mobilization of support from large numbers of rural Sufis as well.⁵⁴ Such a structure was reflected as well in the Muslim League’s conflicted attitudes toward the Land Alienation Act, whose “tribal” definitions were now morally condemned as a challenge to a purer, more individualistic form of Muslim equality (*masawat*) that defined the national meaning of Pakistan. Yet, on a practical level, the underlying linking of property holding to “tribal” (“natural”) difference remained central to the exclusion of Muslim kamins (and women) from landowning, and this was accepted as an ongoing and necessary feature of local rural life, whatever Pakistan’s higher moral claims.

If the campaign for Pakistan thus rejected in critical ways the moral legitimacy of colonial rule in the name of a new nation, Muslim nationalism also mirrored certain key structural features of the old Indus basin colonial regime. Like the colonial state, which had mobilized through statute and custom communities

defined by opposing (and never fully reconciled) relationships to nature, the Muslim League laid claim to Pakistan in an idiom of nationalism marked by strikingly similar contradictions.

Partition and the Nation's Contradictions

Yet whatever the conflicted structures of Sikh and Muslim nationalism, the evolution of environment and community as the British departed was profoundly influenced not just by the deep tensions built into Indus basin nationalisms but also by the particular territorial form that India's 1947 partition took. With the creation of the independent states of India and Pakistan, the Indus basin was sliced in two, with 47 percent of the basin's total land area going to Pakistan and 39 percent to India.⁵⁵ The irony of the razor-like cartographic incision of 1947 was that it divided not only the river basin but also the Sikh and the Muslim communities themselves (and the Hindu community as well). The great works of the Punjab's irrigation system, developed over a century, thus served as silent, concrete witnesses to the massive migrations and horrific violence partition unleashed, as hundreds of thousands of refugees, caught on the wrong sides of the new partition line, fled from the Lyallpur canal colonies back across the Balloki and Ferozepore barrages—and across the line—to the regions their ancestors had left half a century earlier. The very process of partition thus juxtaposed visions of idealized unity—represented in concrete by the integrated, infrastructure of the “natural” river basin—against the worldly realities of partition's violence and division.

The vertigo this partition generated can be seen nowhere more clearly than in the reactions of British engineers. As Gerald Lacey's comments discussed at the beginning of this book suggest, most engineers saw the transition from “colonial” to “national” in 1947 as no intrinsic challenge to basic engineering principles, for the “national” takeover of the works begun by the British was easily read as a fulfillment, a realization of the vision of common community embodied in the engineering aspiration to bring the natural environment to heel for the larger productive advance of mankind. Engineering principles, after all, knew no national boundaries, even if the “nation” defined the most advanced form of modern state necessary to put such principles into action.

But in the immediate context of a partition that had cut the river basin in two, most British engineers saw the events of 1947 in quite different terms. Many engineers (and officials) could make sense of partition only by defining it as a manifestation of “politics” in its most parochial form, a politics (like the politics of *biradari*) that was the *antithesis* of the idealism implicit in the story of nature's conquest (and of the coming of the nation) as a universal story. It reflected not men acting upon nature but nature acting upon men. Such a view was nowhere clearer than in the comments of A. M. R. Montagu, chief engineer of the Punjab (quoted at the head of this chapter), who was seemingly stunned by the inexplicable severing in

1947 of a river basin whose integration had been his life's work. It was to explain the seemingly inexplicable that Montagu, like many engineers, fell back on the profession's sense of apolitical community. Engineers were concerned, he said, with the "immutable laws of nature." In contrast, partition was the product of politics. "Man makes his own laws as he goes along—and immediately breaks them," Montagu wrote. "I prefer water." In such a view, the "politics" that had produced partition had nothing to do with science. Nor, by implication, could such politics have anything to do with an aspirational vision of nationalism capable of transcending this parochial, "political" realm.

Such a view of partition was also visible in the thinking of Sir Cyril Radcliffe, the man who drew the actual line that divided the river basin. In Radcliffe's eyes, the image of the unified river basin as a product of the long history of colonial engineering seemingly stood as a rebuke to the lesser, parochial principles on which he had been tasked to draw the partition line. As Justice Muhammad Munir, a member of the Punjab Boundary Commission, later remembered, Radcliffe was a man "obsessed" with partition's effects on the canal system, which he saw as one of Britain's greatest moral and imperial legacies to the subcontinent.⁵⁶ Yet the very terms of Radcliffe's partition brief allowed him no way to keep the system intact. As Lucy Chester notes in her study of the partition process, despite later controversies about the exact positioning of the partition line in relation to irrigation works (particularly with respect to the critical Madhopur and Ferozepur headworks on the Ravi and Sutlej, respectively, whose positions are discussed below), it was impossible for Radcliffe to draw *any* line that could workably divide the region's irrigation works even into separate, rationalized segments (that is, encapsulated "natural" parts of a united whole)—any more than it was possible for him to fully encapsulate religious communities on opposing sides of the line.⁵⁷ Radcliffe's reported suggestion to Jawaharlal Nehru and Muhammad Ali Jinnah, the leaders of the Congress and the Muslim League, respectively, that they should agree in advance to maintain the unity of the irrigation system by running it jointly after partition can be seen as a reflection both of his genuine frustration with the job he had been given and of his concern to deflect any responsibility for the river basin's division from the British to the parochial intransigence of Indian politicians.⁵⁸

For their part, both Nehru and Jinnah were understandably hostile to Radcliffe's suggestion, precisely because it seemingly used the "natural" river basin to denigrate their visions of nationhood. But, in fact, both Nehru and Jinnah were themselves sensitive to the potentially parochializing meanings of the partition line, for in cutting across the "natural" river basin, it challenged the larger aspirational visions—of a united India and of a united Muslim nation transcending politics—that defined their own larger imaginings of the nation. Given the actual structuring of partition, the dilemma for both was clear: How were they

to assert territorial control over the Indus region's now-divided waters without abandoning the universalizing implications for central authority—and for the nation—long associated with using nature's unifying laws to bring the river basin under productive control?

The dilemmas facing both India and Pakistan in dealing with this had been evident in their unwillingness to face up to the practical implications of a divided irrigation system, even as Radcliffe was devising his lines. In the summer of 1947, a Punjab Partition subcommittee had foreseen “no question of varying the authorized shares of water to which the two Zones and the various canals are entitled,” thus suggesting no change in the status quo.⁵⁹ And even after the partition line was drawn, the chief engineers of east and west Punjab met in December 1947 to sign a “standstill agreement” that “provided among other things that the pre-Partition allocation of water in the Indus Basin irrigation system would be maintained.”⁶⁰ Indeed, in spite of their unwillingness to face the theoretical implications of partition as a division of nature, the contradictions facing the new states in giving environmental meaning to their new nationhood remained unresolved. The disposition of the river basin thus came ultimately to be deeply caught up in the problematic relation between nation and nature that partition left behind.

The Water Stops

On April 1, 1948, the day after the expiration of the standstill agreement signed the previous December, India moved suddenly—and unilaterally—to stop the flow of the main canals crossing the partition line. It was an act that came with little warning, but one that can only be seen against the backdrop of partition's violence and the dislocation between community and territory that it had brought. In one sense, it could be read as an act intended to cut through the contradictions partition had engendered by making nature conform to the territorial nation—a nation now viewed, in the wake of partition's violence, as a proprietary entity, with the model of private property providing the frame for the assertion of control over both territory and water alike. As one Pakistani engineer later put it, India's actions on April 1 reflected a new claim to “proprietary rights” after partition over all water that physically flowed through its territory.⁶¹ But although a powerful idea, the concern to make the flow of water conform to the new national boundaries of the state was hardly the whole story.

To understand the water stoppage of 1948, it is essential to grasp how the relationship between parts and whole within the river basin had now come to be tied up with the new relationships between parts and wholes that defined the new nations that had been created. For, far from an unambiguously “national” action, the stopping of water flows at the partition boundary was initiated not by Nehru or the central Indian government but by the new east Punjab government, reportedly infuriating Nehru, who was later reported to have castigated the “East

Punjab Government and its engineers . . . for ‘having taken the law into their own hands.’”⁶² Indeed, it was an act seemingly directed at Delhi as much as it was at Pakistan, almost certainly influenced by politics among the Sikhs (though there is little concrete evidence of the exact origin of the stoppage order), who were struggling within east Punjab to find a new environmental foundation for community in the wake of the mass migrations following partition. With the Hindu-dominated Congress deeply divided into two warring factions in the Punjab, the Akali Sikhs exerted considerable influence on the east Punjab government’s policy at this time.⁶³ As Aloys Michel suggests, the assertion of control over the Punjab’s waters probably reflected ongoing Sikh concerns to deal with their own contradictory partition legacies, including the loss of sacred sites and canal colony lands. But it also reflected their concerns to lay claim to a new environment in the wake of partition’s failure to provide any overt recognition of Sikh territorial claims.⁶⁴ In this sense, the cutoff was less a manifestation of India’s proprietary, national claims than a product of the uncertainties associated with the reorientations of community identities—and their environmental definitions—in partition’s aftermath.

Yet to say this is hardly to deny that the water stoppage took on significance for the central government’s own assertion of national control over water as well, for Nehru subsequently defended the water cutoff in telegrams exchanged with the Pakistan government as if it were a national act. Indeed, the internal tensions central to the issue were readily apparent in Nehru’s internal exchanges with the east Punjab political leadership during the ensuing weeks. As Nehru wrote to Gopichand Bhargava (chief minister of east Punjab) on April 28 (shortly before flow was restarted in early May), “[W]hatever the legal and technical merits may be, there is little doubt this act will injure us greatly in the world’s eyes. . . . I have little doubt that water will have to be allowed in future because such stoppages cannot occur normally unless there is actual war. To stop water for fields is supposed to be rather an inhuman act.”⁶⁵ Nehru’s language—and in particular his references to “war” and “inhuman”—suggested clearly his concern to project this as an “international” matter in which the moral authority of the center took precedence over any technical—or parochial—Punjabi (or Sikh) water claims. Issues relating to the control of nature involved a higher morality. Nehru’s telegrams to Pakistan and his internal dressing down of the government of east Punjab in the wake of the water stoppage were part of the same strategy to make control over the Indus waters a marker of the central government’s overarching national—and moral—authority.

But the complexities of this effort were evident in Nehru’s longer-term strategy for marking control over nature as a sign of central state authority in the wake of partition. His strategy was perhaps clearest in his well-known remarks in 1954 associating the central state’s moral authority with the first large water project developed on the Indian side of the Punjab’s partition line after 1947, the Bhakra dam. In inaugurating a portion of the Bhakra-Nangal project, at whose heart lay the still unfinished Bhakra dam—the first great storage dam in the Indus system—Nehru

declared such dams to be the “temples of new India,” thus linking the development of east Punjab’s water resources to moral principles for state authority that seemingly transcended the narrow self-interest that produced the 1948 water cutoff. Indeed, he linked this to old traditions of moral kingship, now recast in terms of modern developmental action upon nature. As Kathleen Morrison points out, Nehru’s language with reference to the new Bhakra dam evoked a distinctively Indian dharmic vision of royal benevolence, linked to irrigation and productive transformation.⁶⁶ But Nehru’s language also drew on the old universalizing language of empire’s “scientific mission,” now associated, in effect, with a new vision of “national” control over nature, encompassing engineers and the people alike.

Yet even in Nehru’s 1954 Bhakra-Nangal speech, the echoes of the conflicts generated by the 1948 water stoppage lurked only slightly beneath the surface. If his speech is best remembered for his invocation of the nation’s dharmic adaptation of science for the control of nature, no discussion of Bhakra could ignore how the project had been shaped by partition, for India’s claims to the Sutlej waters involved were directly influenced by the division of the river basin by Radcliffe’s line. However much Nehru sought to project a transcendent community (that rose above the parochial pressures that had produced the water cutoff), the prime minister well knew that the project in its current form was only made possible by India’s assertion of a full legal claim to the flows of the Sutlej. Issues of Bhakra’s impact on downstream flows had been a central subject in discussions about the planned dam before partition, particularly with respect to Sind—and had been at the heart of the proceedings of the Rau Commission. But Nehru now breezily dismissed such discussions, making clear that they could not possibly be allowed to impinge on India’s freedom to lay claim to all the Sutlej river’s water for the Bhakra project.⁶⁷ “They have an inexhaustible supply of water for their canals,” he said of Pakistan (in the same “dams as temples” speech). “Under the circumstances, why should there be complaints and outcry?”⁶⁸ Nehru’s contradictory positions (for he hardly ignored entirely the larger legal and moral issues relating to flows into Pakistan) can be read as part of his continuing efforts to balance two different visions of national authority linked to the river basin and its control. While an overarching river basin—and the unities of scientific understandings of nature—framed Nehru’s appeal to “dams as temples,” these were trumped by narrow territorial nationalism when it came to making sure that Pakistan’s claims could in no way impinge on his signature development project in the Punjab, a concern critical, in a political sense, to coopt regional interests by making it clear that the Punjab’s interests in Bhakra were safe in the hands of the center.

Tellingly, such contradictions now marked the rhetoric of India’s engineers as well. Daniel Klingensmith’s discussion of the emergence of a new, “nationalist” engineering ethos in India in the wake of partition illustrates this clearly. Klingensmith details the emergence in the mid-twentieth century of what he terms a new

“nationalist engineer” coming out of the twin frameworks of Roorkee and the Punjab Irrigation Department.⁶⁹ These engineers shared fully in engineering’s universalizing culture of commitment to science, rooted in the glorification of an idealized apolitical temperament dictated by the subordination of self to the dictates of the laws of nature. But, like Nehru, they too were caught up in the contradictions inherent in a partition that had divided the river basin and thus seemed to set science and national identity at odds. Strongly committed to India’s claims to the eastern river waters, many engineers sought to justify their new “nationalist” water demands by casting them in the language of equity drawn from technical pre-partition debates about regional and provincial water allocations, with east Punjab now replacing Sind as the aggrieved party. India’s claims were thus projected as the necessary reorientations in a system in which pre-partition investments had, for technical and financial reasons, previously favored west Punjab. As N. D. Gulhati (a leading Punjab engineer and water negotiator) noted, of the twenty-six million acres irrigated by the Indus canals, India could in 1947 claim only five million acres as compared to Pakistan’s twenty-one million acres, and India’s share of the system’s total water in 1947 was even less (leaving irrigation water, as Gulhati put it, spread “much more thinly” on the Indian side of the border). Even as they took up India’s national claims, engineers thus continued to advance arguments, much like those used by provincial engineers before partition, that remained grounded in a language of competing claims within a still interconnected river basin encompassing multiple parts.⁷⁰

In the wake of partition, however, such arguments only thinly concealed the emergence of a worldview in which engineering principles were easily subordinated to national claims that had a very different logic. Nowhere is this clearer than in Klingensmith’s account of the career of Kanwar Sain, a prominent Roorkee-educated Punjab engineer, for whom the appeal to apolitical science was in a very uneasy relationship with what was now projected as an equally “selfless” identity as servant of the nation.⁷¹ It was such a vision of serving the nation that (apparently) motivated Sain’s intervention (through the influence of the maharaja of Bikaner) in the Radcliffe award to make sure that parts of Ferozepore district critical to east Punjab irrigation did not go to Pakistan, an overtly political (and seemingly self-interested) act.⁷² Sain was also a central mover immediately after partition in plans for a massive new Rajasthan canal taking off the Sutlej in east Punjab, a canal that would divert a large portion of eastern river flows (previously going to Pakistan) to water the “great deserts” of Rajasthan, “where,” as he put it, “hardly anything grows at present,” and which would thus be “converted into thousands of square miles of fertile lands.”⁷³ Here was language redolent of the colonial story of “civilizational” progress long associated with the ongoing conquest of Indus basin “wasteland,” a universal, *human* saga linked to the progressive replacement of pastoralism by agriculture. Yet, in the wake of partition, the new political context for this was inescapable. The Rajasthan canal, a self-consciously “national” project,

was now explicitly conceptualized not so much as extending earlier projects of pastoral settlement to a higher stage but as simply *replacing* west Punjab's canal colonies with new canal colonies on Indian soil. In Gulhati's words, the aim was to create "new irrigation colonies . . . in Rajasthan, *in lieu of* Lyallpur and Montgomery we have lost to Pakistan."⁷⁴ Civilizational progress was, in other words, simultaneously subsumed and trumped by national identity. Pressures to develop plans for a vast diversion of water into the Rajasthan desert accelerated after the April 1948 water stoppage as it became clear that, in negotiations over water supplies, India's plans to make full "use" of its water as soon as feasible would be a critical element in justifying India's claims in ongoing discussions with Pakistan.

This was a logic, of course, driven not so much by nature and its control as by the primacy of the partition boundary. It was a logic backed by a new calculus of national power, with India as the upper riparian now laying claim to water for its vast new projects in Rajasthan as a matter of national right—and with "nationalist engineers" in the vanguard. But the contradictions that division of the river basin entailed remained, and nothing embodied these more clearly than the subsequent fate of the huge Rajasthan canal project, whose history we will briefly trace in the next chapter. For if it marked both the continuities and the disjunctions that came with partition, it emerged also as a key to the conflicted meanings of "national" and "provincial" water control on the Indian side of the border.

Such contradictions in the relationship between nature and the nation were hardly confined to India in the wake of partition. The contradictions in Pakistan's efforts were equally marked as it sought to appropriate the logic of the river basin to underscore its own vision of national community. In certain ways, Pakistani developments mirrored those on the Indian side. Yet developments in Pakistan followed a different trajectory for two critical reasons. First, Pakistan had now become, at a stroke, the lower riparian, and it found itself suddenly having to deal with a set of choices and pressures far different from those facing India, whose ability to unilaterally take control of water had been dramatically demonstrated by the April 1948 water cutoff. Second, and perhaps equally important, the question of Indus basin water control quickly became intertwined for Pakistan with the new state's efforts to bring to earth—on a specific environment—the highly idealized, aspirational framing of "national" community that had shaped the state's original founding. And in this, the relationship of the "nation" to the Indus river basin environment became a substantive issue of significant ideological import.

The April 1948 water stoppage can be read as a seminal moment in efforts in Pakistan to ground what had been initially a significantly deterritorialized vision of Muslim "nationhood" onto the distinctly spatialized contours of the Indus basin, an issue far more critical for Pakistan than for India. Indeed, the events suggest the vital importance of material conditions in shaping such a national imagining. The water cutoff gained particular prominence in the nationalist rhetoric of the Pun-

jab's urban middle classes precisely because its impact was nowhere on more immediate display than in the Punjab provincial capital of Lahore, where the urban population witnessed directly the cutting off of supplies to the Lahore branch of the Upper Bari Doab canal. The canal's flows bifurcated the city, dividing the civil lines from the cantonment, and had long provided an important element in the city's sense of place as a garden city.⁷⁵ And now, in April 1948, the canal ran dry.

As an environmental spectacle shaped by partition—and dramatizing how environment and national community were tied up in the fate of the river basin—this had no parallel on the Indian side. As the *Pakistan Times* editorialized, during the nearly five weeks without water, “what should have been green fields” had “shimmered barrenly in the merciless sun.” When “water gurgled” once again in the canal on May 5 (after the announcement of an Inter-Dominion conference to be held at Delhi to deal with the issue), the paper reported that the “great excitement among Lahore people” was almost palpable as they “flocked” to the canal bank.⁷⁶ Estimates of the losses from the “water blockade” were put by them at two crores. But most important, the paper observed, the resumption of water could “hardly dissolve the residue of apprehension and anxiety produced by this national ordeal,” whose uncertainties would “continue to beleague our national existence until some permanent solution for our difficulties is found.”⁷⁷ The stoppage of canal water, perhaps more than any other single event in the first year of Pakistan's existence, gave Radcliffe's artificial line simultaneous “natural” and “national” meaning.

This was also a vision of national community in which irrigation engineering was thrust to the front lines of the new nation's imagining and defense. The connection between the moral claims of an imagined Pakistani nation and the technical structure of the river basin became now a matter of public consciousness. In the short run, Pakistan faced, as Michel puts it, a coming “kharif season without water for 5.5% of her cropland,” the areas watered by the Upper Bari Doab and Divalpur canals, and this forced Pakistan at the Inter-Dominion conference to compromise simply to get water flows restarted.⁷⁸ India agreed to resume flows in the canals (since it did not in the short run have the ability to make use of most of the water anyway), but it drove a hard bargain. It required the west Punjab government to deposit a sum of money with India (as a “seignorage,” a term harking back to assertion of full state ownership of water in the Canal Act), and it laid out a framework in which east Punjab would “progressively” diminish the supply going to these canals in order to give west Punjab “reasonable time,” as the agreement put it, “to tap alternative sources.” For their part, Pakistan's delegation recognized the “natural anxiety” of east Punjab to use water to develop areas “which were underdeveloped in relation to parts of west Punjab” (an argument pushed, as we have seen, by east Punjab's engineers, and one which Pakistani negotiators later claimed they were forced to accept under duress). Pakistan attempted to assert in the document its continuing “right” to existing usages of water flowing across the

new border in accordance “with international law and equity.” But India gave such a “right” no formal recognition.

Pakistan’s negotiators thus returned from Delhi with an urgent sense of the need to launch new works to counter Pakistan’s dependent position as lower riparian, a dependence that seemed to challenge their very autonomy as a new nation. As Malik (the young engineer whom we met earlier in his dealings with Daultana) tells the story, senior Irrigation Department engineers were summoned almost immediately after the return of the negotiators from Delhi in early May 1948 to respond to the situation as a “national emergency.”⁷⁹ They began to rapidly construct a new “Sutlej link-channel” circling around the Ferozepore barrage to maintain access to Sutlej flow should India try to stop it again (which proved in the end a fruitless effort in the face of India’s ultimate construction farther upstream of the Harike barrage).⁸⁰ Most important was the immediate launching of a large new canal project (known ultimately as the Bambanwala-Ravi-Bedian-Dipalpur [BRBD] canal) that would run parallel to the new border, entirely within Pakistani territory, and carry water to feed the Upper Bari Doab canal system whose supply had been cut off in April (see map 8). Though beginning as a “Ravi-Bari Doab connecting channel,” this canal was conceptualized from the beginning as ultimately carrying water from the Jhelum and Chenab to free Pakistan from dependence on the Indian-controlled supply at Madhopur and thus to allow the nation to take control of its own water. In final design, it took off from the Upper Chenab canal at Bambanwala, ran beneath the Ravi in a huge siphon, and tracked the Indian border south to Bedian in Lahore district (from where it was later extended farther south to feed the Dipalpur canal as well). This was clearly a canal intended to sever Pakistan’s supply from India and to make it “self-sufficient.”⁸¹ In running along the border, it was also imagined as a defensive bulwark facing the new partition line, a physical line tracking Radcliffe’s constructed partition boundary, which later gained significance as an embodiment of Pakistani national identity as a line of protection for Lahore’s citizens from Indian invasion during the 1965 Indo-Pakistan war. It was dubbed by some at that time the “Ghazi [warrior] canal.”⁸²

Most noteworthy was the conceptualization of these works not simply as engineering projects but also as a “national” mobilization that tapped into the individualized moral rhetoric of Pakistan’s creation and defined an environment that was *Pakistani*. The labor to dig these new canals was rhetorically projected by government leaders as driven by national sacrifice and service, involving both volunteers from Lahore (such as government Muhammadan Anglo-Oriental College students, some of whom had probably taken an active part in the Pakistan campaign—and who now posed for a newspaper photograph at the canal site, spades in hand), and villagers along the canal route, who were mobilized to complete canal sections while working for rations and a minimal wage. As Malik describes it, “tens of scores of students; both boys and girls, were brought to dig the channel.

It was symbolic of patriotic fervor aroused by full-throated media hype.⁸³ The structure of labor mobilization also harked back in some ways to the old *chher* system, rooted in a reciprocal exchange of labor for water rights. Canal sections (in a reflection of the old *dakh* system) were assigned to particular villages, and the government offered a prize of Rs. 1,000 for the village along the channel that was the first to finish its “allotted share of digging.”⁸⁴

The canal thus evoked a vision of a common community of productive interest, but one that was now inextricably linked to a language of selfless, individual sacrifice in the name of the nation. Major Mubarik Ali Shah (Punjab revenue minister) thus exhorted canal laborers to “work in the spirit of missionaries and not mercenaries, for the good and greatness of your national State.”⁸⁵ It was their sacrifice and resolve, Ghazanfar Ali Khan (Punjab minister for refugees) told them, that would “make Pakistan independent of any outside influence or patronage. This is for the first time after the establishment of your national State,” he went on, “. . . that you have risen as one man” to grapple with the task. “The channel you are digging today will go down as a permanent monument to your valour and patriotism.”⁸⁶ Here engineers, laborers, and water users were imagined as a community of common productive interest that was also, seemingly, one of individual moral transformation, linked to productive self-interest yet rising above it in the name of national community. It created a model of an “imagined” national community, in Anderson’s sense, defined by common action upon nature.

Yet, reflecting the backdrop to Pakistan’s own creation, this was a model that probably did little, outside Lahore and its environs, to challenge a structure of local politics of which “tribal,” village, and *biradari* leaders controlled the contours. In fact, a relatively small part of Pakistan was immediately affected. And, it should be noted, the provincial ministers who spoke so eloquently of a patriotic mobilization themselves came from political bases deeply rooted in structures of landlordism and tribal *biradari*. Even as they sought, in alliance with engineers, to mobilize an active community of Pakistani irrigators remaking the canal network to protect a distinctly Pakistani water environment, the jockeying for power among these leaders continued to reflect the sharp dichotomy between a *rhetoric* of community that transcended the claims of local landlord influence and *biradari*, and a political *reality* in which factional jockeying, rooted in such local networks, had already come to define the stuff of politics in post-partition west Punjab.⁸⁷

Perhaps even more importantly, however, the popular mobilization associated with the construction of the BRBD canal crystallized a much larger dilemma facing Pakistan in its attempt to mobilize a community linked to the engineered river basin. However powerful the rhetoric of Pakistan’s “national” reaction to India’s water cutoff, Pakistan’s official, diplomatic response to India’s water policies in these years lay, ironically, not in self-sufficiency but in strongly asserting the morality of its *continuing* claims to waters flowing from east Punjab based on

international legal doctrines of prior use. For, if the full impact of Sutlej/Beas and Ravi flows on downstream irrigation were taken into account, the impact of these water losses for Pakistan was far more significant than what could be readily replaced by new, hastily constructed works such as the BRBD canal.⁸⁸ The unresolved tensions this created were suggested graphically by the comments of Sardar Shaukat Hyat (Punjab revenue minister and son of the late Unionist leader Sir Sikander Hyat Khan) at the inauguration of digging on the canal in June 1948. Shaukat effusively praised the spirit of independence and self-sufficiency that defined the BRBD project. But, in the same breath, he noted Pakistan's reliance on the waters of the Ravi and the Sutlej, which they had used for the past seventy-five years, and which "we are permanently entitled to."⁸⁹ As Shaukat's comments suggest, construction of new works to replace waters coming across the border from India in no way meant that Pakistan renounced its "rights" in the flows of the rivers originating on the other side of the border. If Pakistan's actions seemingly reflected a desire to orchestrate a populist, "nationalist" mobilization to assert territorial self-sufficiency over its water environment, Pakistan also sought to demand the continuance of trans-border flows on the basis of its moral and legal claims to equity as well as prior use on the basis of a still functioning, unitary "river basin" system that was shared with India—however much this goal was in tension with an interest in "self-sufficiency."

In continuing to make these claims, Pakistan, like India, was asserting, in effect, two juxtaposed meanings of the "nation" in relationship to the environment: one based on the mobilization of a "people" defined by the absolute primacy of the partition boundary, the other based on Pakistan's claims as a sovereign nation to rights enforceable within the larger community of nations of which it had now become a part. In this aim, the appeal to natural unity of the river basin, in spite of partition, remained central. Pakistan's claims on the waters of the Indus basin in the wake of the Indian water blockade were thus, like India's, marked by sharp contradictions, in which different relationships to nature defined the ongoing assertion of a new "national community."

Internationalizing the National Community

Only in relation to such contradictions in their own positions can we understand India's and Pakistan's reactions to a new proposal for international mediation of the Indus waters dispute in 1951. The initial framework for this mediation was provided by David Lilienthal, former director of the Tennessee Valley Authority in the United States, who toured the Indus basin in 1951 and, on his return, published an article that came to provide the foundation for the World Bank to enter into the thicket of Indo-Pakistani water negotiations as a mediator. Lilienthal's ideas carried weight in India and Pakistan precisely because he had the cachet of the American TVA, which was widely viewed at that time as the most advanced (and "dem-

ocratic”) model for integrated river basin development in the world.⁹⁰ But at the heart of Lilienthal’s proposals lay an effort to reformulate the colonial engineering dichotomy between unifying “science” and divisive “politics” in accord with a new, postcolonial “development” framework dominated by the United States. “The new Tennessee Valley,” Lilienthal wrote in 1949, “speaks in a tongue that is universal among men, a language of things close to the everyday lives of people: soil, forests, factories, minerals, rivers.”⁹¹ Here the vision of the river basin as a community of producers was re-legitimized in the context of a new, post-colonial international order. Lilienthal’s Cold War preoccupations were directly reflected in the title of his article on the Indo-Pakistani water conflict: “Another Korea in the Making?”⁹² But the key to his proposal lay in his projection of a vision of community rooted in an apolitical—and universalizing—vision of “developmental” action upon nature defined precisely in contrast to the parochialism and divisiveness of “political” ideology.

Lilienthal’s proposals can be seen as marking a key moment in which the colonial framing of the Indus basin’s transformation was now translated into the language of a new international “developmental” order emanating from the United States. Yet there is little doubt that they also drew heavily on the colonial language of “apolitical” river basin engineering that was evident in British colonial responses to partition. Long before 1947, Lilienthal explained in his article, “British-trained engineers” (including Indians) had seen “the river basin as a unity, as it is in nature,” and had developed from this perspective a common sense of purpose in maximizing the effective use of water in an integrated system of many parts. It was against this backdrop, he observed, that partition, “a politico-religious instrument,” had in 1947 fallen on the Indus basin “like an ax,” separating Hindu, Sikh, and Muslim “colleagues who had worked together all their lives, elbow to elbow.” But not even partition’s violence, he argued, could “repeal engineering or professional principles;” it had only “made them secondary, for a time, to politics and emotion.” By returning to the common commitment to put to use the still considerable “wasted waters” of the Indus basin flowing “unused to the sea,” India and Pakistan could thus unite in “a common project that is not political but functional,” as he put it, “a part of life, and based on technical skill and human need”—and in the process end the “degenerating quarrel” over water that had followed the drawing of the partition boundary.⁹³

Lilienthal did not in any way question the national integrity of the two new states that had come into being at partition in 1947. There was no question of the river basin’s interconnections actually undoing partition, for that was a *fait accompli*. Indeed, the acceptance of a world of nations lay at the heart of post-war American worldviews. Lilienthal also recognized that water was not the only—or even the most important—issue dividing India and Pakistan: that was Kashmir. But he saw a focus on water as providing a framework for transcending the divisions of

these new states, for it offered a solution rooted in the border-crossing unities of nature itself, which were once again cast in conceptual opposition to the parochialism that the “politics” of partition (with nature acting upon man in contrast to the operation of rational productive interests) represented. It was in this context that Lilienthal’s proposals were soon taken up by Eugene Black, the president of the World Bank, who offered the bank’s “good offices” to refocus India and Pakistan on a new round of water negotiations based on Lilienthal’s “developmental” principles.

Given the continuities of Lilienthal’s vision with Radcliffe’s quickly rejected recommendation for joint river basin management at the time of partition in 1947, it is in some ways surprising that both India and Pakistan should have accepted Lilienthal’s arguments so readily—and the World Bank’s mediation. But, as we have seen, both countries were eager to lay claim to the aspirational nationalism that this framework of common commitment to the unifying frame of the river basin—and to apolitical “development”—implied, particularly in light of the internal political stresses that both faced in the post-partition years. Both central states were strongly attracted to a negotiating framework that allowed them to cast the Indian and Pakistani “national” states as standing above their own internal “parochial” politics through appeals to science and nature, even in the face of the river basin’s division.

This was most true for Nehru, who, in the face of evidence in early 1953 that the Punjab had once again in late 1952 begun to restrict canal flows into Pakistan without central authorization, spoke of the framework of World Bank mediation, with its internationalist backdrop, as one that put India’s “honour and our reputation” on the line, a clear sign of the value Nehru put on internationalism as a framework for controlling (and even shaming) India’s more parochial regional and communal forces.⁹⁴ In a broader sense, this was powerfully linked for Nehru to what we might call “national developmentalism,” that is, to the notion that only the commitment to development as a national undertaking could tame the baser—and more parochial—pressures of communalism and sectional interests that threatened Indian unity, a problem nowhere more stark in Nehru’s mind than in the Punjab in the wake of partition. Indeed, for Nehru such a “developmental” vision was linked not only to the “development” of politics and the economy but also to the “development” of the individual citizen.⁹⁵

Given its position as lower riparian, Pakistan had more immediate reasons to embrace external mediation, since without India’s ability to actually control cross-border flows, Pakistan had far more to gain, and far less to lose, from the World Bank’s entrance into water negotiations. But for Pakistan, too, the acceptance of bank mediation reflected not just pragmatic calculation but also some of the same considerations motivating Nehru. Jinnah’s old vision of a Muslim nation—defined by “unity, faith, and discipline”—was one cast in stark opposition to such localized

“politics,” and the engagement of Pakistan’s new leaders with the “natural” river basin—and with a structure of international negotiation predicated on its unity—was attractive on many levels. This resonated with a vision of Pakistani national identity as a product of each individual’s higher aspirations, a vision of the nation cast in contrast to the baser manipulation of parochial loyalties and, indeed, to the self-interested manipulation of Islam itself. The technical—and sometimes legalistic—language of Pakistan’s case in international negotiations could be mobilized as a counterweight to the efforts of provincial leaders like Mumtaz Daultana to turn the center’s sometimes emotive anti-Indian language to their own more parochial political purposes, a tendency clear in Daultana’s efforts to use such language to define a special place for “the brave and self-respecting people” of west Punjab at the helm of the river basin in the struggle against India.⁹⁶ Given the potentially internally destabilizing character of such appeals, it is hardly surprising that officials at the center saw considerable attraction in bringing the water issue into a framework of international mediation.

Neither nation could, however, fully escape from the contradictory pressures on the meaning of the environment, and its relationship to the meaning of the “nation,” that had been unleashed by partition’s concrete boundary-drawing. Both countries (but particularly the upper riparian, India) laid down significant limitations on their participation in the negotiations even as they accepted the general principle of the World Bank’s mediation. Nehru, for example, though responding favorably to the stress on the river basin as a “single unity,” was insistent from the very beginning that the Bhakra dam project, which was critically important to Delhi’s relations with the Punjab, be kept completely outside the framework of the new bank-mediated negotiations, whatever complaints this drew from Pakistan. He was also categorical in his rejection of any form of joint river basin management that might impede India’s sovereign proprietary control over its own, partition-delimited, water supply.⁹⁷ Pakistan, too, mixed a rhetoric morally invoking international legal conventions and river basin science with an often strident assertion of the fundamental threat posed by India’s control over water to its very existence, an assertion matching India’s proprietary claims to water with its own. Nowhere was this clearer than in an official pamphlet issued by Pakistan’s embassy in Washington, D.C. in 1953 in the midst of the talks projecting Pakistan’s case as operating above the narrow nationalist claims driving India, even as it framed the water conflict in emotive terms as a struggle for national “existence.”⁹⁸

Given these constraints, the talks made little headway toward a mutually agreeable solution in the years after their beginnings in 1951. It was thus left to the World Bank to cut through the arguments by offering a solution in 1954 that was as radical as it was simple. The river basin itself would, in effect, be physically divided to match the territorial division represented by partition. The proposal was summed up in a World Bank press release:

The entire flow of the Western rivers (Indus, Jhelum and Chenab) would be available for the exclusive use and benefit of Pakistan, except for the insignificant volume of Jhelum flow presently used in Kashmir. The entire flow of the Eastern rivers (Ravi, Beas and Sutlej) would be available for the exclusive use and benefit of India, and for development by India, except that for a specified transition period India would continue to supply from these rivers, in accordance with an agreed schedule, the historic withdrawals from these rivers in Pakistan.⁹⁹

The “natural” environment would be pried apart, in other words, so that the territorial boundaries that had defined the “nation” at partition could take developmental precedence.

This was, of course, a proposal marked by considerable irony. Lilienthal’s original proposal had been aimed precisely in looking to nature as a framework for transcending national divisions. Rhetorically, the bank pressed this proposal as one still deeply engaged with the river basin as a unity. The national bifurcation of river management it proposed was projected as only intended to enhance the “development” of the river basin as a whole by recognizing the primacy of the “nation” in developmental practice (an approach central to most of the bank’s work). “There is every reason to believe,” the bank declared, “that leaving each country free to develop its own resources, and without having to obtain the agreement of the other at each point, will in the long run most effectively promote the efficient development of the whole system.”¹⁰⁰

But the departure from the spirit of Lilienthal’s proposal could not have been more dramatic. “National” power was no longer linked to an aspirational control over nature that transcended partition’s boundaries (and parochial politics) but rather was now vested in a plan to make the natural environment itself conform to the territorial boundaries that partition (that “politico-religious instrument,” as Lilienthal had called it) had dictated. The bank’s 1954 proposals thus shifted the ground fundamentally with respect to the meanings attached to the river basin itself as a frame for the negotiations, forever transforming the ways that both India and Pakistan sought to define their overarching authority in relationship to the Indus basin environment.

On the one hand, the proposals shifted the nature of the negotiations between India and Pakistan themselves, offering India, the upper riparian, a seeming victory in the pursuit of its major immediate negotiating goal. For Pakistan’s negotiators, on the other hand, the bank’s plan seemed to represent a complete repudiation of their claims for continuing rights to already appropriated flows coming from India. Reacting in shock, Pakistan’s negotiators briefly considered abandoning the negotiations altogether. But with few alternatives as the lower riparian, they returned to the negotiations and, in the event, ultimately shifted their focus to compensation for their lost waters. This determined the dynamics of the final stages of negotiations leading to the signing of the Indus Waters Treaty in 1960

along the basic lines of the proposal the bank had laid out (as we will see in the next chapter).

The ramifications of the plan went far beyond the changing positions of the two countries within the talks. In the long run, the World Bank's shift was also to dramatically transform, on multiple levels, the ways in which environment and community were mutually constructed and configured internally as the two states dealt with the subsequent large-scale transformations that marked the basin in the wake of the treaty. These were played out both in terms of center-province relations and in terms of the relationships between technical, engineering authority, on the one hand, and the structure of "politics," with all its parochial connotations, on the other—on both sides of the border. If the years after 1920 had opened up a new era in which the structure of control over nature had defined the Indus basin as a system of multiple parts (in relation to an emerging system of nesting provinces), the legacies of this continued to influence both "politics" and "development" in the subsequent decades—though in dramatically different ways on the two sides of the border.

The Indus Waters Treaty and Its Afterlives

The Indus Waters Treaty of 1960 (which was modeled on the World Bank's 1954 plan) has often been hailed as one of the great success stories of international water disputes. As Syed S. Kirmani put it in 1990, "The Indus Waters Treaty is one of the most remarkable examples of a treaty that led to successful management of conflicts between sovereign riparian countries of a large river basin and served to promote development and prosperity in both countries."¹ The treaty continued to function in the face of several wars between India and Pakistan, and it led to an explosion of new works on both sides of the border. Already in 1947 one of the largest and most complex irrigation systems in the world, the Indus basin, now divided by the treaty into two distinct "national" parts, witnessed a surge in efforts to make "use" of an ever-larger percentage of the river basin's overall flow.

Yet the treaty's structuring of the relationship between environment and community was also marked by a striking irony that was rooted in the treaty's most basic presumptions. Though signed by states that had, in the years after 1947, used their relationships to science and nature to justify new visions of national community and state authority, the treaty severed the "natural unities" that had formerly lain at the heart of the Indus basin's "development." The river basin—as a simultaneously natural and engineered entity—provided the frame for the signing of the treaty, but the actual terms of the agreement made little effort to establish structures of common control dictated by nature; rather, it sought to remake the environment to conform to the new territorial boundaries that had marked partition.² While the Treaty thus marked a key moment in the efforts of the two post-colonial states of the Indus basin to lay claim to the mantle of scientific domination over nature as a key feature of post-colonial statecraft (in the tradition of the

colonial state before them), the treaty also—ironically—undercut such claims by subordinating nature to the logic of “politics” and “national” property.

This produced significant, if quite different, consequences on the two sides of the border. We can briefly trace evolving relationships between environment and community in two critical areas. Our first focus will be on how the treaty reoriented the provincial conflicts over water on both sides of the border. Provinces remained parts of larger wholes, but they were now embedded not only in different political systems (with different structural relations between center and provinces) but also in different technical structures of river basin management, reconstituted in response to the way the old river basin was divided. The history of post-1960 water conflict—between center and provinces, and between provinces themselves—suggests how the technical remaking of the divided river basin now framed a politics of water in which technical issues and the mobilization of community around affective attachments to the water environment came to be interconnected as never before.

Our second focus will be on the relationship between *local* community and the new politics/statecraft that the water treaty engendered. Scrutinizing the meaning of “local” (and of “local community”) points toward the ways that the colonial tensions between different visions of nature—and of human community—continued to influence the evolution of the now divided Indus water system after 1960. Here we will look particularly at Pakistan, which received the larger part of the river basin, where the restructuring of the Indus basin water system came to be far more deeply implicated in the structuring of national politics than was the case with India. Since the loss of the eastern rivers required a significant intensification in water capture in Pakistan—and systematic reduction in the river basin’s “wasted” flows to the sea—the treaty led in Pakistan to powerful new modelings of control over nature, drawing sustenance from international technical expertise and monetary support that in aspiration pushed state authority to the local level in ways that had never been the case before 1947 (at least not since the canal protests of 1907). But if this shaped a context in which the “local community” took on new significance, its meanings were profoundly affected both by the evolution of Pakistani statecraft in the decades after 1960 and by the powerful new international, intellectual, and political discourses that deeply impinged on Pakistani “development.”

THE RIVER BASIN IDEA AND PROVINCIAL POLITICS

At the root of the complex political tensions leading to the Indus Waters Treaty, as we saw in chapter 6, lay the conflicted meanings attached to the old idea of the river basin now that the Indus basin itself had been territorially divided. Indeed, the *idea* of the river basin as an integrated natural unit, so important to the vision of David Lilienthal that had launched the treaty negotiations, continued to exert a

powerful influence on political ideas on both sides of the border. But, in the wake of the treaty, this was an idea transformed both by the physical division of the partition boundary and by the new—and differing—structures of statecraft within which the idea came to be embedded on opposite sides of the border.

The role of the environmental vision of the river basin in politics can perhaps be traced most clearly through a brief comparative examination of center-provincial water conflict. Such conflicts had many aspects, but critical to all of them was a vision of the river basin not simply as a scientific concept (necessarily involving the technical relationships between systemic wholes and their many parts) but also as an affective reality, defining the “natural” meanings of national and provincial identities within the contexts of the new Indian and Pakistani political systems. The history of these conflicts, as we have seen, can be traced back to the era after 1920 as competition between provinces within a “system of multiple parts” began to grow, but it took on new political form in the decades after 1960, particularly as water stresses linked to rising populations and the more intensive water demands of the green revolution influenced agriculture on both sides of the border.

India

In India, as we have seen, tension between the Indian center and the new east Punjab government was present from the moment of partition itself. With the territorial meaning of Sikh community in the wake of partition uncertain, the control of the waters of the eastern rivers hinged not just on India’s relations with Pakistan but also on the ways that “national” and “regional” projections of community were bound up with control over the new water environment. This was reflected in the 1948 water stoppage and in subsequent center-provincial controversies over control of border flows in 1952 and 1953 as well. But the World Bank’s 1954 proposals (even before their final realization in the treaty terms of 1960) fundamentally altered the course of these conflicts by, in a sense, putting India’s full national control over the eastern rivers under international imprimatur. This was the backdrop to Delhi’s efforts to quickly consolidate its position by engineering a centrally directed water-sharing agreement, the Interstate Water Agreement of 1955, which distributed the full flow of the Ravi and Beas among the Punjab, PEPSU (the union of the east Punjab princely states, which was soon amalgamated with the Punjab in 1956), Rajasthan, and Kashmir (even though full “use” under the 1960 treaty would wait until the end of a ten-year transitional period ending in 1970).³ Because Prime Minister Nehru had deliberately kept the Sutlej waters already committed to the Bhakra project outside the framework of the treaty negotiations, these were not part of the agreement. Still, the agreement laid foundations for the center’s efforts to structure “an integrated program of development” for all the eastern river waters, both encompassing and subordinating provincial interests to a centrally mobilized vision of an integrated whole.⁴

The Indian government's attempt to reconstitute the "eastern rivers" as a separate "natural" river basin of interlocking parts, with the "nation" as its arbiter, was from the beginning fraught with contradictions. This was partly because, as James Wescoat has put it, "the allocation of tributary rivers" no longer "lent itself" to the same "'river basin' approach."⁵ The construction of a series of dams and link canals (most importantly the Ravi-Beas link, built in the 1950s) was critical to the attempt to relink these tributary rivers and to define them as a single river system. But the now missing lower river basin—within which the rivers had previously come together and flowed to the sea—remained as a sort of phantom of lost unity, like pain from a now missing limb, stalking their reassembly into a river basin vision. The previous "natural" links to this downstream world were always implicit in the attempt to reconstitute an "eastern" Indus basin—and yet the formal repudiation of those links within the new treaty framework with Pakistan meant that they could never be openly acknowledged.

Perhaps equally important, the form of the center's own efforts to lay claim to the moral mantle of integrated Indus river basin development highlighted deep ambiguities. The centerpiece of Delhi's effort, embodied in the 1955 agreement, was the projection of the Rajasthan canal as the key to India's laying claim to the old, civilizing colonial model of using technical expertise to bring formerly pastoral "wastelands" under productive agriculture—and thus to make the deserts bloom. The water distribution under the agreement thus awarded slightly over 50 percent of the total Ravi-Beas waters to Rajasthan for this massive project. But, in the eyes of many Punjabis, this agenda seemed to undercut the center's own efforts to ground its control in the remaking of a "natural" river basin, for Rajasthan was not, technically speaking, an Indus riparian state at all. Though the inclusion of Rajasthan in the water-sharing agreement was a legal outgrowth of the earlier, pre-partition claims of Bikaner state to Sutlej flows (and of the importance of the projected Rajasthan canal in India's negotiating claims with the World Bank and Pakistan), Rajasthan had no riparian river frontage on any of the Indus tributaries. Far from fully reconstituting an "eastern" river basin composed of multiple parts, the 1955 agreement thus set the stage for the subsequent development of a series of long-running water conflicts between the center and the Punjab rooted in conflicting appeals to the integrity of the river basin idea itself.⁶

The political form of these water conflicts was shaped by the cultural imperatives of the larger Indian states reorganization begun in the 1950s, which came to a head in the Indus basin region with the separation of Haryana from Punjab in 1966. The backdrop for this was the Indian States Reorganization Act of 1956, which had underscored the importance of provinces not simply as administrative units within a larger developmental whole (as Nehru preferred to see them) but as linguistic states that embodied "natural" communities (of language and culture) in their own right. It is hardly a surprise that this came to frame water conflicts in the

old Indus basin region, for Nehru initially resisted the creation of a Punjabi linguistic state in the region on the grounds that it was a cover for an anti-national Sikh “communal” identity, a form of community that Nehru had already come to experience as a potential threat to rationalized water development in the region, beginning with the trans-border water stoppage in 1948.

A separate Punjabi state was finally accepted on linguistic grounds after Nehru’s death, but the center’s continuing concern to maintain a position of overarching control in water matters was reflected in its special insertion into the 1966 Punjab Reorganization Act of a provision that gave Delhi a central role in the allocation of water rights and liabilities between Punjab and Haryana, in spite of the fact that, under the Constitution, irrigation remained a provincial subject.⁷ Should the two states fail to arrive at an agreement within two years, the act declared, the central government was given the right to determine the interstate water allocation, which led Delhi in 1976 to issue its own award for the division of water between the states (during Indira Gandhi’s “emergency”). This award was a source of controversy from its inception and was at various points embraced and rejected by both sides. But, in the eyes of many Punjabis, the center’s claims to serve as a *moral* arbiter of river basin water rights had long since been undermined by the center’s seeming willingness to transfer water out of the river basin, first to Rajasthan and now to Haryana.⁸ Indeed, over the next decade, the provincial division of waters became an important element in the generally deteriorating relations between Akali Sikhs and the center, culminating in the explosive events of 1984 that produced Operation Bluestar and Indira Gandhi’s assassination.

Perhaps most telling was the way that the *idea* of the river basin as an environmental touchstone for a vision of “community” was now used not to strengthen but to challenge central, “national” authority. It was the Akalis who now publicly mobilized an image of community association with the river basin as a moral frame for *resistance* to the center’s water policy. The Akalis invoked the Punjab’s (and, in particular, the Sikh community’s) historical association with the old river basin (and the encapsulation of the Punjab within it as the “land of the five rivers”) to challenge Haryana’s water allocations. For central government officials, the argument that Haryana was not an Indus rivers riparian was nonsense, for the original 1976 award to Haryana had grown directly out of the legal division of the old pre-1966 Punjab, all parts of which had an established legal claim on the eastern rivers under the 1955 Interstate Water Agreement, whether Haryana now had riparian frontage on the Indus tributaries or not. But for many Punjabis, particularly Sikhs, it was the center that had seemingly violated the claims of both science and nature—and thus undercut its own “national” standing as the river basin’s arbiter.

Nothing crystallized the new terms of the conflict more clearly than the controversy over the construction of the new Sutlej-Yamuna Link (SYL) canal, intended

to carry Indus basin water to Haryana (and into the Ganges basin) under the terms of the center's 1976 award (see map 9). Construction on the canal was begun in Haryana in 1982 after an agreement on its building mediated by the central government in 1981. Its continued construction was subsequently affirmed by the Rajiv-Longowal Accord of 1985. But continuing controversy over the canal (which was caught up in internal Punjabi political conflict as well) reflected the ways that particular canal projects could now be mobilized as symbolic threats to the very foundations of provincial "community" as it was grounded in distinctive claims on the natural environment (a development that we will see in Pakistan also). The canal's construction was now seen by many as a physical embodiment of the center's transgressions against the Sikhs' community-based struggle for a territorial identity dating back to the very traumas of partition. "Stop the Canal!" ("Nahar roko!") ran the emotive slogan, as the Akalis mobilized in the early 1980s to emphasize the link between the protection of the Punjab from water transfers to Haryana and a sense of united Sikh "community" linked to a distinctive provincial water environment, defined by an old vision of the "natural" integrity of the Indus river basin. Critically, the target of this protest was not simply Haryana and its water claims but also the transgression of principles that had once defined the center's own overarching claims to technical (and moral) authority. Even the 1955 award to Rajasthan, which had originally been accepted by many in the Punjab in the 1950s as a logical outgrowth of center-led negotiations with Pakistan under World Bank auspices (negotiations in which its plans to use its newly claimed water to conquer the desert in Rajasthan played an important role), was now attacked as an amoral water transfer outside the basin.⁹ And the transgression involved was only underscored for many when, in the wake of Indira Gandhi's 1984 assassination by her Sikh bodyguards (followed by the targeted revenge killings of Sikhs in Delhi, abetted by the local Congress party), the central government decided to rename the Rajasthan canal the "Indira Gandhi canal" in her honor. Nothing could have suggested more clearly the association of the center's "nationalizing" water claims with a policy defined not by the natural logic of science and the river basin but by the political demands of central Congress power. What had begun as a "national" project rooted after partition in India's efforts to lay claim to the universalizing authority associated with the transformation of "wastelands" into productive agriculture had thus been symbolically transformed into a specifically "political" project now widely perceived among Sikhs as directed against the Punjab.

It is critical to note, of course, that such political mobilizations around water issues in the Punjab also had a strong material base. The backdrop to calls for "justice" in water matters—a critical element in the Akali case against the center—lay in the agricultural transformations that had marked the Punjab since 1966, as green revolution technologies had transformed the region into one of the most

productive in India. These technologies had also escalated demands for water as the key to production, an increasingly scarce commodity in the wake of the huge expansion of lands under irrigation command in the wake of the large-scale award of “new” water to India under the Indus Waters Treaty. Indeed, the treaty’s own structure had seemingly mandated that water be spread “thinly and widely” after partition, much as the British had before 1947, if India was to mount an effective claim on its “use.” Nothing illustrated this more than the links between water shortages in the Punjab and the ongoing progress of the Indira Gandhi canal in Rajasthan, whose opening in stages after the commencement of irrigation in 1961 led to ongoing recriminations about shortages and water availability in both the Punjab and Rajasthan. One antidote to increasing surface-flow shortages was a vast expansion in groundwater pumping, which led ultimately to critical groundwater stress as well; by the beginning of the twentieth-first century, this stress had become so acute that it now exerted a significant influence on Punjabi water attitudes more broadly.¹⁰

As such developments indicated, the Akali focus on water was not simply a product of abstract identity politics but closely linked to the powerful new economic pressures bearing on individual Punjabi farmers, who were caught up in the “rapid diversification” and “mechanization of farming” (as the 1978 resolutions of the All-India Akali Conference, based on the earlier Anandpur resolution, put it) that had come in the wake of the extensive dissemination of higher-yielding—but more water intensive—green revolution crop varieties.¹¹ Such concerns, prominent during the years of significant unrest in the 1980s, continued subsequently as Punjabi farmers faced built-in water shortages. The key to the casting of the Punjab’s water demands in terms of the integrity of the river basin thus lay in the fact that water shortages linked individual productive interest to an older vision of community tied to the natural logic of the river basin, a logic now articulated in terms of the Punjab’s water claims against neighboring states.

Indeed, as water shortages in the Punjab became more acute, the dispute gained a new lease on life in 2004 when, in the face of an adverse Supreme Court judgment ordering the Punjab to complete the SYL canal, the state government passed the Punjab Termination of Agreements Bill, which repudiated all earlier agreements relating to the canal’s completion.¹² As an act of defiance against central authority, this prompted an immediate reference by the president of India to the Supreme Court. However, even as the issue was caught up both in Punjabi relations with the center and in internal political jockeying within the Punjab, the appeal to the idea of the river basin was now mobilized to assert a “natural” Punjabi (and Sikh) identity that transcended such divisions. As one Sikh author wrote in 2004, in a continuing critique of the still unfinished SYL, the three erstwhile eastern rivers of the Indus basin (Ravi, Beas, and Sutlej) had, “even in their most playful abundance,” never “cultivated any riparian relationship with Haryana or

Rajasthan.”¹³ The idea of the river basin as a frame for resistance to the central government’s water policy now found expression in the evocation of a “natural” identity, transcending rational questions of production—an identity linked to an emotive image of the old, pre-partition river basin that now existed only in memory. With the negotiations with Pakistan receding in time, the lost river basin—as an idea—had become an imaginative frame for Punjabis to culturally reclaim a regional identity linked to a historical Punjab including even the rivers now in Pakistan—with their old connections to sacred Sikh sites and popular Punjabi stories like Hir-Ranjha and Mirza-Sahiban. “The common denominator” of Punjabi identity, associated with the very name “five rivers,” this author wrote, “is the silvery wreath of its rivers which embraces Punjab in its sweet hug.”¹⁴ The lost river basin was, in a sense, imaginatively reclaimed on an affective level and mobilized as an answer to the technical and legal pressures that defined the new, post-treaty structure of water control in India.

Attempts to project the image of the river basin as an environment were thus cast now in both affective and productive terms. At times these were reinforcing, as in the national effort to mobilize a vision of control over a “natural” river basin comprising the eastern rivers, a key to projecting a community of production among the provinces, mediated by the central government. But the center’s efforts to replicate the old colonial conquest of the desert as a political and moral undertaking had proved problematic from the beginning. Efforts to project a developmental unity onto the eastern rivers as an arena of rationalized, productive planning were thus countered by visions of community linked to the idea of the old river basin as a “natural” entity that had now been violated by the center for political reasons. If these two forms of community, defined in relationship to environments and nature, had roots going back to the nineteenth century, then in the context of the division of water in the 1960 treaty they had taken on striking new forms.

Pakistan

Such was the case in Pakistan as well, though the trajectory of developments there was quite different from that in India. This was evident from the moment of the World Bank’s announcement of its 1954 plan, the effect of which in Pakistan—even before the final signing of the treaty in 1960—was to substantially *heighten* the central state’s claims to overarching technical authority in order to handle what was projected as a national crisis prompted by the loss of the eastern rivers. The imperative for remaking the Indus basin as an interconnected system in order to compensate for lost water was, from the beginning, projected as requiring the subordination of the various parts of the system to the technical, systemic demands of the river basin as a whole in the name of “national” survival. The projection of this as a technical, *depoliticized* imperative of state power was underscored by the

critical requirements for Pakistan to tap into massive quantities of foreign assistance—and technical expertise—to make this happen. This also intersected with a distinctive Pakistani statecraft emerging in these years, linked to the projection of a depoliticized vision of state power conceived as standing above society (a vision that dovetailed with the highly idealized, aspirational vision of the nation that had shaped Pakistan's creation). Indeed, it suggested how the structural implications of the treaty were very different for Pakistan than for India.

Pakistan's critical dependence on foreign technical and financial aid under the framework of the treaty had become clear in the period between the unveiling of the bank's 1954 plan and the signing of the final treaty in 1960. With its claims to continue to use the eastern rivers seemingly rejected by the bank in 1954, a vision of Pakistan as a competitor for water with India within the larger river basin (which at times had led to calls for popular political mobilization in support of Pakistan's water claims) gradually gave way to a government negotiating strategy focused not on the justice of Pakistan's claims but on maximizing Pakistan's compensation, both from India and, even more importantly, from the international community, for the waters it would lose. With the military takeover by Ayub Khan in 1958, this emphasis gained full sway. The bank itself had recognized (in its 1956 Aide Memoire) that large-scale compensation would be necessary to make good Pakistan's water losses—and that large-scale foreign assistance would be necessary for new works. In the last years before the treaty, this had become the central focus of Ayub's approach to the negotiations.

The final treaty thus involved a huge foreign funding package for Pakistan's newly formulated Indus Basin Project (IBP), involving the construction of multiple dams and barrages on the western rivers to compensate for the loss of water from the east. Even in the context of the Indus basin's long colonial history (which had, by 1947, already produced the largest integrated irrigation system on the globe), the size (and cost) of this project was breathtaking: it embodied, as Aloys Michel puts it, "the largest single irrigation project in [the world's] history."¹⁵ And it dominated the final phase of the treaty negotiations before 1960, which had less to do with Pakistan's claims against India (which had agreed to pay a fixed share of Pakistan's replacement costs, in part offset by the bank) than it did with the critical negotiation of a huge foreign aid package. It was fitting, as Michel notes, that the final Indus Waters Treaty in 1960 was ultimately "published as an Annexure to the Development Fund Agreement [providing external funding for Pakistan's works], rather than vice versa." It suggested the way "that the Bank and the 'friendly Governments,' chiefly the United States [who provided significant funding for the plan] had actually purchased an agreement."¹⁶ And in the process, the role of the Pakistani state itself was transformed from being the voice of the Pakistani irrigator in a struggle for "national" justice against India (a struggle linked to the principles of Pakistan's creation, as was embodied, for example, in the popular mobili-

zation associated with the construction of the BRBD canal) to the redefinition of the state as essentially an official conduit for foreign technical and financial aid for assimilating Pakistan to an international, Cold War development order—the price tag, in the eyes of the donors, for bringing geopolitical stability to South Asia.¹⁷

This did not mean, of course, that water conflicts among Pakistan's provinces disappeared, but it meant they took a far different form than in India. In the wake of the decision to divide the rivers, overarching technical authority came to be vested in Pakistan in a large new “national” engineering bureaucracy tasked with the river basin's reconstruction, a significant shift from the pre-partition era, when provincial irrigation departments had controlled virtually all irrigation affairs. Most important among these new institutions were the Indus Basin Advisory Board, appointed in 1959 to draw up specific plans to complete the IBP, and the new Water and Power Development Authority (WAPDA) of West Pakistan, which in 1958 was given significant operational and planning authority throughout the new river basin. WAPDA soon became, as Wescoat puts it, “one of the largest river basin planning organizations in the world—a Tennessee Valley Authority (TVA) on a national scale.”¹⁸ It represented, in a sense, a realization of Lilienthal's “apolitical” dream, not in a form transcending the nation but one driven by the need to make nature conform to the nation's (or at least to West Pakistan's) boundaries.

This “nationalization” of water management was encouraged by—and itself encouraged—broader political developments in Pakistan, reshaping relations between the center and the states, and suggesting how these issues intersected inescapably in these years with broader issues of statecraft. Even as India was moving in the mid-1950s toward its “linguistic states” policy, Pakistan had moved in 1955 to amalgamate all of West Pakistan into a single unit, without internal provincial boundaries at all. It was a policy undertaken ostensibly to “balance” East Pakistan with a single West Pakistan within Pakistan's constitutional structure, but the “one unit” scheme was also a reflection of a newly “depoliticized” vision of West Pakistan as a “developmental” whole united by the Indus river system, whose overarching technical management was now projected, in an echo of Lilienthal's earlier vision, as the antithesis of the “politics” defining West Pakistan's former provinces. This was an idea nowhere more clearly delineated than by the comments of Ayub Khan, then commander-in-chief of Pakistan's armed forces and soon to be Pakistan's military dictator, in supporting the “one unit” idea. West Pakistan “must be welded into one unit,” Ayub wrote in 1954, “and all artificial provincial boundaries removed, regardless of any prejudices to the contrary, which are more the creation of politicians than real. . . . Lying as it does in the basin of the Indus river and its tributaries,” West Pakistan's “future economic development must be considered as a whole to achieve maximum results.”¹⁹ Ayub thus projected the engineering management of the river basin as a task that stood apart from (and was, indeed, the antithesis of) the parochialisms of “politics” that defined Pakistan's provincial identities.²⁰

Ayub's attempt to depoliticize and "technicalize" provincial water relations was reflected in the approach of a series of centrally appointed commissions on provincial water allocations beginning in the late 1960s and extending through the 1980s. The most serious complaints about water allocations in the Indus basin had historically come from Sind. But Sind's position within the Indus basin had in some ways changed from the days before partition, particularly as a result of several large projects undertaken in the 1950s (in part as an outgrowth of the pre-partition negotiations discussed in chapter 6), including the Kotri barrage (at the top of the Indus delta in lower Sind, completed in 1956) and a bit later the Guddu barrage (in upper Sind, north of the Sukkur barrage), begun in 1957 and opened in 1962. These projects can be seen as part of the long transition in Sind from inundation to weir-controlled canals that brought Sind and the Punjab closer to a common, "modern" technical level within the larger structure of Indus basin irrigation.²¹ But questions about interprovincial distribution in the face of the transformations brought by the IBP gained new prominence in the late 1960s²² and were heightened with the end of "one-unit" in 1969 and the restoration of democratic government in 1970–71 (amid the catastrophe of West Pakistan's military suppression of East Pakistan and the emergence of an independent Bangladesh). Efforts by a series of commissions over the next two decades to develop a formula for interprovincial water distribution were overwhelmingly framed by the structure of thinking that had come to dominate in the Ayub years, a framework within which issues of interregional water distribution had been almost wholly "technicalized." The West Pakistan Water Allocation and Rates Committee (also known as the Akhtar Hussain Committee) in the late 1960s, the Fazle Akbar Commission in 1970, the Anwar-ul-Haq Commission in 1981, and the Haleem Commission in 1983 all sought to find technical, apolitical formulas for interprovincial water allocation dictated by the river basin's technical dynamics.²³ But all faced the problem that, with the rhetoric of river basin management having been formally "technicalized" during the preceding era, "technical" language was now widely perceived as itself only a cover for political interests.

This development provides a backdrop within which it is instructive to contrast the cultural terms in which provincial resistance was couched in Pakistan during the 1970s and 1980s—in this case by Sind—as compared with the language of such resistance in Indian Punjab during the same period. Sind's politics were quite different from those of Indian Punjab, for Sind remained a region of marked landholding inequalities, with few structures of popular mobilization comparable to the Central Gurdwara Management Committee (SGPC) or the Akali Party among the Sikhs, and little of the agricultural dynamism associated with the green revolution in Indian Punjab (or, for that matter, in Pakistani Punjab as well). But, at least among some political elites, Sindi cultural identity came to be associated in public rhetoric with the mobilization of a river-linked identity as a form of resistance to

central domination. Yet this was associated *not* with a mobilization of the river basin idea as an affective frame for resisting central domination (as was the case in Indian Punjab) but, rather, with a challenge to the center's technicalization of integrated river basin management through an emotive appeal to Sind's association with one particular river—the Indus—whose special meaning for Sind was pruned out of the technical river basin framework and came to serve as a symbol of Sind's special claims to water (and of a Sindi identity linked to nature). It was on this basis that Sind sought to lay claim to water in opposition both to the claims of the Punjab and to the presumed technical authority of the Pakistan state over the river basin as a whole.

The very name of the river Indus in both Urdu and Pakistan's regional languages, the *Darya-i Sind* or "River of Sind," suggested the framework within which Sind asserted a special relationship to the river, defying its position as lower riparian. As one Sindi author explained it, the Indus river was an integral part of the "culture, personality and psyche of the Sindi people."²⁴ Such a relationship, Sindis argued, had been recognized during the colonial period in the never-ratified draft agreement between the Punjab's and Sind's chief engineers in 1945 that had framed the division of rivers in the Indus basin not simply in terms of the rights of upper and lower riparians but also in terms of Sind's rights to the waters of the Indus as a *separate* river. This agreement had given Sind 75 percent of the Indus river's flow, whereas the Punjab got the preponderance of the flow (94 percent) of the five Punjab rivers.²⁵ Although most Sindi engineers were well aware that in technical terms Sind's irrigation could not be easily separated from the larger interconnections defining the river basin, they nevertheless cited the terms of this unratified agreement as a technical frame for Sind's special claims on the Indus, as distinct from the flows of the other western tributaries. But it was Sind's special *cultural* claims on the Indus that gave this meaning as a frame for resistance to central water management.

Indeed, as many Sindis argued, the very structure of the Indus Waters Treaty had provided cover for what they now saw as a Punjabi assault, abetted by the central government, on Sind's special environmental and cultural identification with the Indus as a distinctive river. The first of the major IBP dams, the Mangla dam on the Jhelum, constructed with World Bank funding from 1961 to 1967, did not directly touch the waters of the Indus. But the subsequent Tarbela dam, completed in 1976, impounded the waters of the Indus itself before they reached Sind and ultimately took on quite different cultural meanings. Though built in part to supply electric power, the dam also played a major role—in conjunction with a series of barrages and link canals built farther down the Indus—in the project of transferring "replacement" waters to southern Punjab to make good losses from the eastern rivers. As Sind's engineers well understood, the Tarbela dam's storage capacity was important to Sind as well, particularly in the rabi season when the

loss of the eastern river water was most clearly felt. However, the dam also made Sind's water supplies dependent on engineering decisions made upstream, and in ways that opened the Indus to national "technical" control, potentially at Sind's expense. Sind's attack thus focused most directly on the downstream barrages that transferred water stored at Tarbela to other parts of the Punjab. These included the Taunsa-Panjnad link and, most importantly, the Chashma-Jhelum Link (CJL), completed in 1971, which allowed for the transfer of Indus waters through additional links, all the way to the Ravi and Sutlej and onward to Bahawalpur to compensate for water losses in Punjab's Sutlej valley project (see map 9).

Here, again, a comparison with Indian Punjab highlights the distinctive dynamics of such conflicts on the Pakistani side of the border—and the ways that a particular canal could be made to carry heavy symbolic baggage as a marker of the distinctive environmental visions now shaping provincial identity. As a critical link in the diversion of Indus water to feed canals in the Punjab, the CJL took on some of the same symbolic significance that the SYL canal had assumed for the Sikhs in India in carrying water outside the river basin to Haryana. But in Sind's case, the canal came to be symbolically tied to a water-based provincial identity linked not to association with a "natural" river basin under assault from the center but, rather, to cultural identification with a single river, under assault from an engineering bureaucracy that claimed to act in the name of a technicalized river basin as a whole.

The charged implications of tapping Indus flows through these links lay at the heart of an explosion of public controversy during the early years of the Zulfiqar Ali Bhutto regime after democracy first returned to Pakistan in the early 1970s. When, in early 1972, engineers sought to fully open the CJL to divert water out of the Indus for use in southern Punjab at a time of critical water shortages throughout the system, some Sindi leaders portrayed this as nothing short of Punjabi water theft. Referring to the CJL as a "robber canal" (a moral personification that can be contrasted with the "national" personification of the BRBD canal during the 1965 Indo-Pakistan war as a "ghazi," or holy warrior, on the side of Pakistan), one later author characterized the canal's opening (in tandem with the Taunsa-Panjnad link) as simply the "loot and plunder" of "the waters of the Indus[,] the last remaining source of the life of the lower riparian Sindh."²⁶ This episode led to the appointment in 1972 of an ad hoc commission of provincial governors (headed by Mumtaz Bhutto) to review the issue, which ruled that the CJL should be opened only in years when Sind's water was in surplus and even then only with Sind's prior approval.²⁷ But it hardly settled the issue and became the subject of ongoing contest.

Indeed, Sind's claims on the Indus brought forth their own counter-reactions in the Punjab. When debate on the CJL resurfaced in the mid-1980s, questions relating to its opening and closing in times of overall water shortage once again provoked bitter recriminations between the provinces and led to a protracted debate

in the Punjab Assembly on Sind's right to demand the closure of the canal. This was now powerfully contested by a range of Punjabi leaders; as one declared, "no other province can take away our rights to these links."²⁸ Sind's claims to water were countered not only by reference to the systemic (and "national") importance of these link canals in the larger structure of Pakistan's IBP (and to the logic of the treaty settlement) but also by the invocation by some of Islam as a language of national morality, operating as a counterweight to what were perceived by many Punjabis as Sind's anti-national demands. Although the Punjab had benefited from the depoliticized framework of "technical" water discussion that had marked earlier decades, some Punjabis now responded to Sindi attacks by mobilizing their own culturally defined water claims.

That the cultural position of the Punjab in such debates was complex is suggested by the comments of Hanif Ramay, an important leader of Bhutto's Pakistan People's Party and former Punjab chief minister during the Bhutto years, on the CJL closings. Ramay himself, though hardly prone to Islamist rhetoric, invoked Islamic language in the 1980s to underscore the issues of moral justice underlying such water disputes. "The closing of the Chashma-Jhelum link canal created a Karbala in the Punjab," he wrote, suggesting the human suffering from water shortage that morally linked the Karbala story—and the suffering of the Prophet's grandson, Husain, in the face of the worldly power of the caliph Yazid—to the effects of canal closures on southern Punjab. This was not simply an answer to Sind but an attempt to redefine the Punjab's own cultural interests in water as themselves rooted not just in technical but also in moral claims. Just as "after every Karbala Islam lives," Ramay wrote, "this canal closing has given life in Punjab to a sleeping feeling of *Panjabiyat* [Punjabiness]."²⁹ Here a sense of provincial identity and provincial community (*panjabiyat*) was linked to an emotive identification with the water environment couched in language transcending the technicalities of production. For some, evocations of *panjabiyat* were summoned from Punjab's precolonial pastoral roots, from the worlds of the same great Punjabi folk stories, predating canal colony settlement, that were invoked in Indian Punjab.³⁰

But this hardly changed the larger dynamics of a highly technicalized, "national" water management structure that most Punjabis continued to see as critical to their own material interests. Ramay himself went on to suggest that the Indus, the *Darya-i Sind*, might be renamed the *Darya-i Pakistan* to signify its critical place as a *national* river, thus underscoring its centrality as the backbone of an integrated river basin system. As Ramay saw it, this could still leave room for political, inter-provincial debate that could encompass distinctive provincial claims and identities. But it nevertheless suggested the primacy of an approach to water that hinged on a vision of the river basin as a unified, interconnected whole (within which the Indus remained firmly embedded). Needless to say, the suggested renaming of the river found no support in Sind. Nor did it shift the continuing association of most

Punjabis with a larger technicalized vision of national control, which they generally saw as protecting their interests.³¹ As Daanish Mustafa puts it, Punjabi water interests in interprovincial controversy tended to be cast primarily in the language of “patriotism, science, economics, and neo-Malthusian scenarios”—that is, in the language of technical interests, sometimes linked to an emotive appeal to Pakistani “national” ideology—but relatively little to a distinctive appeal to Punjabi environmental identity.³²

This dynamic came to shape what emerged in the 1980s as the most significant, long-running water controversy in Pakistan, which focused on the proposed construction of the Kalabagh dam, a second major dam on the Indus below Tarbela at Kalabagh in the Punjab. Approved by the Pakistan government in the 1970s, construction on the Kalabagh dam was originally scheduled to begin in the mid-1980s. Its construction was intimately tied to the old IBP’s logic. With Tarbela projected as having a limited lifespan due to the inevitable effects of heavy silting, many engineers saw the construction of a second Indus dam as absolutely essential to the long-term operation of the Indus water system—and thus to the future of Pakistan’s economy.³³

But the dam soon became a target for attacks on the whole structure of river basin control. For environmental activists, linked not just to Sind but to international nongovernmental organizations (NGOs), the dam epitomized the narrowly technicalist fallacies associated with large-scale dam construction on a worldwide scale. Many opponents in Pakistan came to see the project as symbolizing the anti-democratic character of the narrowly technical and apolitical frame in which the river basin had been cast in Pakistan ever since the 1960 treaty. Opponents thus stressed the already serious environmental deterioration caused by restricted Indus flows below the Kotri barrage in Sind’s Indus delta, an escalating problem the dam threatened to exacerbate. They also noted the likely displacements caused by the dam upstream.³⁴ But at the heart of the intractable political opposition to the dam was Sind’s ongoing opposition to *all* new works on the Indus river itself. As one Sindi dam opponent put it, “[I]mpounding of the resourceful Indus river and the diversion of water to Punjab and NWFP [North-West Frontier Province, now Khyber Pakhtunkhwa] will never be acceptable to the people of Sind.”³⁵

This did not mean that cooperation among the provinces was impossible. In the years after the end of General Muhammad Zia-ul-Haq’s military regime, an interprovincial Water Accord was negotiated by provincial political leaders and signed by the four provincial chief ministers in 1991, at a time when all four of the provinces were under the common political control of Prime Minister Nawaz Sharif’s Muslim League-N party. The Water Accord of 1991 created a mutually agreed-upon framework for provincial water allocations and set up an Indus River System Authority, with equal provincial representation, to handle future interprovincial disputes. But it, too, ran into significant problems; its operations were ultimately

overtaken by the difficulties in generating agreement among the provinces on the basic technical parameters on which the accord was based, reflecting the fact that technical measurements had come to be widely seen during the long years of authoritarian rule as themselves “covers” for political interests.³⁶ Controversies continuing to mark the workings of the Water Accord illustrated how the logic of the Indus Waters Treaty had left an indelible imprint on the ways national and provincial identity had found expression in distinctive types of environmental visions.

STATECRAFT AND LOCAL COMMUNITY IN AN EVOLVING SYSTEM

The story of interprovincial water conflict thus suggests how competing visions of community and nature, rooted both in the logic of production and in the emotive evocation of “natural” community as a counterweight to the technical logic of production, had shaped the political evolution of Indus basin water control in the wake of the Indus Waters Treaty—on both sides of the border. But the significance of competing framings of community was also evident after 1960 in another—and in some ways more basic—way, that involving the place of *local* communities within the structures of irrigation administration that the treaty had brought. Indeed, it is here, beneath the high politics of national and provincial water conflict, that we can see perhaps most clearly how old, colonial conceptualizations of community—in competing forms—continued to play themselves out in the history of the river basin in the years after 1960.

Groundwater, Waterlogging, and the Local Community

Our focus here will shift exclusively to Pakistan, where the intersections between technical visions of the river basin and the structuring of local communities loomed largest as the Indus basin was reconstructed during the last four decades of the twentieth century. This was not only because the Indus basin occupied a more important place in the overall structure of statecraft in Pakistan than it did in India (where the old Indus rivers were confined to a relatively small region) but also because Pakistan experienced far more profoundly the buffeting effects of shifting currents in international thinking on water control and “development” in the years after 1960—currents carried to Pakistan by its powerful international donors, most particularly the World Bank. Indeed, the story of the Indus basin in Pakistan suggests how, in the last decades of the twentieth century, just as in the nineteenth-century era of high colonialism, world-wide ideas exerted a profound influence on the local intersection between nature and community in the political construction of the Indus basin environment.

These shifts were seen nowhere more clearly than in the new, systemic emphasis given to groundwater in river basin modeling by irrigation experts in Pakistan

in the years after partition, particularly after the signing of the treaty. Even as the hydraulics of surface flows continued to preoccupy a good deal of river basin analysis in this era—as we have seen in the stories of interprovincial water conflict just discussed—changes in perceptions of groundwater’s *systemic* importance to the river basin led to fundamental transformations in technical river basin modelings, and these led in turn to new ideas on the place of local communities within an evolving water system.

The importance of groundwater to Indus basin irrigation was, of course, hardly a brand new issue in this era. Groundwater levels—and the loss of land to waterlogging and salinity—were major engineering concerns throughout the colonial era. The first comprehensive survey of the water table in the Chenab colony had been undertaken as early as 1908, with engineers subsequently tracking the water table, mapping changing spring levels, and incorporating these data into formulas used in setting irrigation “intensities” (or the percentage of land on each canal or in each colony *chak* that could be irrigated in each year). At the provincial level, a Punjab Water Logging Board was established in 1912, a Drainage Board in 1917, and a Waterlogging Enquiry Committee in 1925, whose researches were aided by an Irrigation Research Institute set up at about the same time in Lahore. Waterlogging conferences met yearly to discuss solutions to the problem.³⁷ In Sind, too, considerable attention was given to waterlogging, particularly in the wake of the opening of the Sukkur barrage canals.³⁸

However, though recognized as a major problem, waterlogging was not generally approached before partition through the same *systematic* science that shaped the hydraulics of surface-flow integration but rather through shifting, piecemeal expedients.³⁹ This was because the dominant colonial engineering ethos, focused on maximizing “acreage per cusec of water rather than to get the maximum yield per acre,” tended to strongly mitigate against any comprehensive waterlogging strategy that might impinge on the larger structure of surface-flow development, which in the eyes of most engineers defined the systemic contours of the river basin.⁴⁰ It was, after all, the science of surface-flow hydraulics, and the interlinking of rivers, that had put colonial water engineering on the international map—and that had defined the great engineering saga of Indus basin transformation. On occasion, as in the report of the Anderson Committee in 1935, some officials saw the problem of waterlogging as potentially “so serious” that they recommended that it constrain new “demands for perennial irrigation, . . . where there is any danger of water-logging.”⁴¹ But, though few canal projects were planned in these years without investigation of water tables and attention to waterlogging and salinity dangers, the reality was that few were willing to let the danger stymie new surface-flow projects.⁴² Rather, officials bemoaned the continuing lack of technical agreement on solutions to the problem, with emphases shifting over time from the restriction of supplies in the 1920s, to drainage works in the 1930s, to “reclamation”

supplies to wash salts out of the soil in the 1940s.⁴³ None suggested an effective, systemic approach to waterlogging problems. The frustration of many engineers in dealing with groundwater issues was expressed by the Punjab chief engineer, A. M. R. Montagu, in an address in 1946 to the Punjab Engineering Congress on the eve of the British departure: “After 38 years [since the first comprehensive survey of waterlogging in the Chenab colony],” he said, “the Punjab Irrigation Engineers” had made so little progress on this front that for all practical purposes they “were back to the same position as in 1908.”⁴⁴

In the 1950s, however, approaches to waterlogging began to change. Arriving foreign experts convinced the government of Pakistan to undertake its first large-scale survey of the “geology and hydrology of the Indus Plain” and—under the influence of new trends in international river basin science—to map groundwater movements as a more integral part of the Indus basin water system.⁴⁵ This was the backdrop not too long afterward to the first of the Salinity Control and Reclamation Projects (SCARP-I), a pilot project in the Chenab colony, funded by a low-interest American loan and focused on the testing of deep tubewells to lower the water table.⁴⁶ But it was only in the early 1960s, after the signing of the Indus Waters Treaty, that new forms of scientific attention to groundwater began to fundamentally transform scientific conceptions of the river basin in Pakistan, with groundwater movements both vertical and horizontal taking an increasingly central place in the basic modeling of the basin as a water system. Ayub Khan himself played a role in this shift when, in the wake of the signing of the treaty and amid ongoing planning for the massive IBP, he labeled the continuing loss of agricultural land to waterlogging and salinity in 1961 as a looming “national catastrophe,” capable of vitiating other Indus basin investments.⁴⁷ Shortly thereafter, he directed WAPDA to prepare an urgent action program to deal with waterlogging, a program that called for massive investment in deep tubewells and thus brought wells—and their coordination with the dynamics of surface canal flows—to the very center of thinking about managing the larger Indus “system.” As the WAPDA plan now put it: “It is only through such a coordinated use of surface and groundwater supplies that the fullest possible benefit from West Pakistan’s total water resources can be realized.”⁴⁸

None of this was to downplay the ongoing importance of large-scale investment in surface flows, for foreign donors had just committed huge sums for the new dams, barrages, and links necessary for Pakistan’s IBP. Indeed, in the face of these commitments, donors initially balked at the cost of the WAPDA action plan (which led Ayub to hint at one point that he might go to the Soviet Union for funding). But Cold War pressures soon dovetailed with new scientific thinking to cement groundwater’s increasingly central place in conceptions of Indus basin water flows. Indeed, this new perspective was reflected in the decision of the American president, John F. Kennedy, to make Pakistan’s waterlogging problem

the focus of a new initiative in the use of “public science” as a tool of Cold War diplomacy. When Ayub visited the United States in 1961 to lobby for more funding, Kennedy responded by appointing a special presidential scientific panel headed by Richard Revelle specifically to bring the latest science to bear on Pakistan’s groundwater/waterlogging issue.⁴⁹ Revelle’s appointment was urged on Kennedy by his science adviser, Jerome Wiesner, a professor of electrical engineering at the Massachusetts Institute of Technology, who saw the problem of waterlogging in Pakistan as an ideal project for the application of American “systems analysis” (originally developed for the military) to development problems. As Wiesner saw it, “the salinity and waterlogging problem in West Pakistan” was a perfect candidate, as it was a problem “amenable to an engineering solution on a systemized basis.”⁵⁰ The Revelle panel thus provided the occasion for the first large-scale attempt at computer simulations of groundwater flow and tubewell operation in the pursuit of such a newly systematized, more complex river basin vision in which surface flows and groundwater movements were equally important.⁵¹ This was, of course, an initiative—with ostensibly “apolitical” science at its heart—that was congenial to Ayub’s own “apolitical” approach to state authority, as we have already seen. As President Kennedy noted in his welcoming speech when Ayub visited the United States in 1961, it was not only Ayub’s commitment to “freedom” (read: anticommunism) that made him a valued Cold War ally but also his “efforts to harness science in order to defeat nature” and to “reclaim your land and make it fruitful.”⁵²

All of this led to the massive expansion of the SCARP programs in the 1960s, focused on the sinking of thousands of state-managed, deep tubewells to try to address the waterlogging and salinity problems in a more systematic manner than had ever been attempted before. Funding came not only from the United States but also from other donors mobilized within the World Bank’s Aid Pakistan consortium and was managed on a national scale by WAPDA. SCARP-I was followed by a series of additional SCARP projects, which led ultimately to the installation of as many as 15,000 public tubewells (pumping water from 40 to 120 meters deep).⁵³ The large majority of these were installed in areas with groundwater of low saline content, which meant that, due to the far higher percentage of saline groundwater in Sind, the undertaking was heavily weighted to the Punjab.⁵⁴ But the significance of these tubewells went beyond the specific locations involved, for they signaled not only a more coordinated approach to waterlogging management but also a critical recognition of the importance of groundwater to the storage capacity of the system as a whole, a vital supplement to the large new dams and link canals already being built to compensate for the loss of the eastern rivers. As Frank van Steenbergen and William Oliemans note, the idea of these public tubewells was that their supply would be integrated into existing surface delivery systems. “The deep drainage-cum-irrigation tubewells were usually installed at the head of a tertiary channel [that is, a chak watercourse],” thus supplementing and compensating for

irregular canal supplies to village watercourses (usually through the mixing of canal supply with groundwater).⁵⁵ As noted by one report sponsored by the U.S. Agency for International Development (USAID) on the Indus basin system in the late 1960s, groundwater storage was by then seen not only as a key to lowering water tables but also, like the surface storage of the recently completed Mangla and planned Tarbela dams, as essential to overall IBP water storage development.⁵⁶

Yet, if tubewell pumping had now brought the interconnections between groundwater and surface flows, between wells and canals, back to the heart of Indus basin irrigation (as had been the case before the colonial “golden age” of surface irrigation under the British), it also raised new questions about how local water users had been—and local communities were to be—conceptualized as fitting into this larger, newly reconceptualized water system. Engineering attention to the dynamics of groundwater had pushed engineers toward greater attention to the most local forms of water use, for it was in the village, in the world “beyond” the canal outlet, that water from wells entered the system (and that considerable “wasted” water entered the ground as well). No longer could the outlet-based *chak* be conceptualized as fully encapsulated in a technical system of surface flows. New, technical visions of groundwater’s critical place in the larger water system thus led to new concerns about the place of the *chak*-level community within technical river basin visions.

Indeed, it was not just the expansion of groundwater development but the particular form that groundwater expansion began to take that brought these issues to the fore. The expansion of public tubewells under the SCARP groundwater programs was followed quickly by another dramatic development: the proliferation of privately owned tubewells in all the SCARP areas (most particularly in the Punjab), which raised new questions about the place of irrigators within the larger water delivery system. So rapid was this transformation that, by the mid- to late 1960s, the number of private tubewells had begun to outstrip the numbers of government tubewells in the SCARP program. And yet so challenging was this to the existing surface-flow ethos of the system that it was a development with no initial grounding in large-scale water planning. As a World Bank report observed in the mid-1960s: “The expansion of canal water and Government tubewells was a planned development much of which was financed by foreign aid from the IBRD [i.e. the World Bank] consortium.” But “the contribution from private tubewells, 30,000 of which were estimated to have been installed up to 1964 was by contrast a surprise, largely unplanned and unnoticed until a survey was made in 1964.”⁵⁷ Indeed, over the subsequent decades it was water from private tubewells far more than the public ones that was responsible for dramatically increasing the role of groundwater in overall irrigation. By 1996, there were well over 300,000 private tubewells in Pakistan (the overwhelming majority in the Punjab), supplying nearly 40 percent of all irrigation water at the farm-gate, and, by 2006, the total

percentage of groundwater supply in the system as a whole had grown to a figure closer to 60 percent (as compared to 8 percent in 1960).⁵⁸ The shifts that had occurred were so dramatic that a few experts now began to talk about canal supply not just in terms of direct water delivery but in terms of its importance for groundwater recharge (which implied a subordination of surface flows to groundwater pumping within the delivery system).⁵⁹ Such developments had critical implications not only for the control and dynamics of waterlogging but also for the most basic organization of the river basin as a water system.⁶⁰

Indeed, if private tubewells were soon recognized as critical to the overall system, they also represented a significant challenge to longstanding assumptions about the management of the Indus basin irrigation system as an integrated technical structure. Management of groundwater—and even, in some areas, of over-pumping—was ultimately to become a central engineering concern as post-treaty irrigation developed.⁶¹ But, on a broader scale, the increasing importance of groundwater in general suggested the need to model and understand the roles of local water users (and local communities) within the larger system in strikingly new ways. At stake was the shift from “a largely supply driven run-of-the-river system,” as one report put it, “to a more demand driven system.”⁶² The explosion of private tubewell owners in particular raised confounding new questions about the relationship of the bureaucracy, the community, and the individual water user in making such a system “work.”⁶³ In the visions of productive community mobilized by engineers, it had always been technical knowledge—rooted in larger understandings of nature—that was the key source of dynamism and the justification for their authority. But the explosion of private tubewells seemed to suggest a new source of dynamism rooted in the independent actions of individual irrigators themselves. And this was all the more critical, because it was a question that inevitably intersected—as had questions of interprovincial water allocation—with larger concerns not only of irrigation management but also of Pakistani statecraft itself.

Community and Politics in the Water Environment

The importance of “communities of irrigators” was an old and central question in the structuring of Indus basin irrigation, with deep historical roots. The presence of communities of water users had, from the beginning, shaped the ways that water, as a resource, was taken under state control and delivered to individual users who paid water charges for crops matured on fixed quantities of land. For those who viewed the system as constituting a large community of producers, adapted to nature’s laws, nesting local communities of irrigators had long been viewed as critical elements within this framework, intermediary links between individual water users and the engineering principles shaping the larger delivery system. But questions of community also brought to the fore not just the roles of

communities in linking individuals to the larger irrigation structure but also the old question of how different *forms* of community were structured by, and in turn themselves structured, relations between water control and the larger political system.

The tensions involved were suggested by the comments of foreign irrigation experts who had begun to analyze the roles of private tubewell owners in local-level context during these years. In the early 1990s, for example, Ruth Meinzen-Dick, a groundwater analyst with the International Food Policy Research Institute, described what she saw as the common heuristic then framing the position of local communities in the system. Indus basin water seemed to flow through multiple realms of control, she noted, as it moved from the main delivery system (where it was the property of the state) to the locally controlled village watercourse system (where it was, in a sense, the “common property of a group of farmers”) to the fields of an individual farmer (where it came under private control and was ultimately put to effective “use”).⁶⁴ This was a powerful heuristic, shared by many engineers themselves. But it was *not* a description of the system’s formal, historical legal structure as it had evolved over more than a century under British rule. Under the terms of the 1873 Canal Act—which, though many times amended, remained in force in Pakistan—all water, including groundwater, was technically the property of the state throughout, from the river to the irrigator’s fields. Such heuristics pointed instead toward the ongoing tensions between statutory law (and the assumptions underlying it) and the local mechanisms through which claims to water had been asserted and adjudicated as the system actually operated.

The precise role of the local community, as a collective entity, standing between the individual user and the larger, technically engineered system, had long been particularly problematic. A brief review of the history of the most important local institution that had shaped this role—the system of warabandi, or the delineation of timed local water shares—illustrates this. As we saw in chapter 4, warabandi was originally a system of turns among shareholders on jointly controlled wells that was formally adapted by the Canal Act to water distribution from fixed canal outlets as point-sources of water (like wells) on canal distributaries. Warabandi defined a local community of common interest in a chak-level system of distribution based on the recording of fixed, individual water shares (calculated as timed turns) linked to measured areas of land. It delineated, in other words, a *local* community defined by the same principles of distribution that shaped the larger, engineered water system as a whole.

But the *formal* recognition of warabandi as a form of village-level community standing between engineers and individual users had long raised red flags for engineers, precisely because existing idioms of local community had been commonly linked in most Indus basin villages to another—and in some ways anti-theoretical—vision of community, one shaped by the genealogical idioms of biradari

and tribe. As we saw earlier, this was a vision with deep roots in property and customary law. What made questions about the operation of warabandi significant was not simply that they brought to the fore tensions between “modern” visions of irrigation efficiency and the “traditional” pressures of genealogically based alliance and local tribal culture, but that they highlighted the deeply rooted tensions defining Indus basin statecraft itself.

Colonial engineers knew well the relationship of equitable local distribution systems to the efficiency of the larger system (and indeed to the imagining of a common community of irrigators linked to the state by commitment to maximizing production). But they were nevertheless wary of structures that would import local forms of “tribal” and genealogical community (including local patronage structures) into professional water administration—and thus disrupt a unifying ideology of technical control. Up until at least the 1940s, the majority of warabandis had thus been *kaccha* warabandis, or systems of timed turns worked out by the irrigators themselves without direct government interference (or enforcement), and considered the irrigators’ own separate affair. Under the pressure of growing water shortages as the system expanded (and population increased), *pakka*, or government-prepared warabandis became more common. These gave engineers the formal power to intervene in cases of warabandi violations (known as *warashikni*), in the name of equity. In actual practice, however, engineers continued to balk at any actions that might transform warabandi turns into state-enforceable “rights,” and for precisely the same reasons that they were wary of defining too formal a role for local communities in irrigation more generally—that is, because the language of “rights” was most commonly associated in the larger structure of colonial law and statecraft with discourses of “custom” and “natural” community, tied largely to “tribe” and genealogy, which seemed to challenge the principles of professional engineering.⁶⁵ While sensitive therefore to the loss of efficiency inherent in the power of a “strong zabardast zamindar” (as one official put it) who violated warabandi arrangements, most engineers nevertheless subscribed in the last decades of British rule to the generally “accepted principle” (even if a still much-debated one) that “the Canal Officers are not to interfere in the internal distribution of water” in individual villages or chaks, even when warabandi violations were involved.⁶⁶

In the years after the 1960s, the warabandi system, as a critical hinge, took on new significance in the larger irrigation structure as new discourses of development and state control reshaped the larger system. At the heart of this lay the growing systemic significance of the village chak itself as the local site where surface and groundwater use intersected. But what made the village all the more important in water planning in these years was that, with the waning of the large infrastructure investments associated with the IBP, financial stringencies themselves forced increasing focus on the efficiency of chak-level water use to deal with water shortages. Greater engineering attention to local water use offered a newly compel-

ling avenue in this context for improving systemic performance without the promise of large new infrastructure projects. The potential scope for improving efficiency at the chak level was dramatically demonstrated in 1973 when a pilot study suggested that water conveyance losses in village watercourses ran in some cases to over 50 percent of the water entering at the outlet. Beyond this, losses seemed to be most severe in areas where new “public” SCARP tubewells had added increasing stress to already poorly maintained village channels.⁶⁷ The mobilization of local community organization at the village level increasingly became, in such circumstances, a critical “strategic resource,” as one World Bank official put it, for bringing greater efficiency to the operation of the system as a whole.⁶⁸

This provided the backdrop for launching a program in the 1980s to establish *formal* village-level Water Users Associations (WUAs) in Pakistan on a wide scale. Conceptually built on the structure of recorded warabandi shares, such communities were given legal form as collectives of entitled water sharers at each outlet who could now be mobilized for coordinated, *rationalized* action in watercourse maintenance. This was linked to an emphasis on efficient on-farm water management practices as well. The assumption was that, if properly organized, all those with defined water shares would have an incentive to participate collectively in watercourse improvement to increase their individual supply and, in the process, to improve the overall efficiency of the larger system.⁶⁹ Authorizing legislation for the formalization of such chak-level WUAs was obtained in each of Pakistan’s provinces, and programs were launched to spread these associations widely. The result was that, by the early 1990s, as many as 14,000 such water user associations operated in Pakistan, mobilized primarily to play roles in village watercourse improvement.

These WUAs were an undoubted success in mobilizing widespread village participation in repairing and reconstructing village watercourses for more effective water conveyance and use. In this sense, they gave the heuristic vision of chak-level community, standing between the individual user and the larger system, more concrete form. But in terms of improving systemic operation and efficiency, their limitations were also readily apparent. They hardly met all the goals associated with the mobilization of local communities as a “resource” in a more efficient irrigation structure—and for reasons in some ways harking back to the history of warabandi itself. If the WUAs gave legal form to a seemingly rationalized local community, officially defined by recorded, individual shares in village water, they remained, for the most part, captives of the limited, project-oriented state administrative goals that lay behind them. As one expert noted, when it came to “water use activities” beyond watercourse improvement, the WUAs were “relatively inactive,” engaging “in little or no activity with respect to the allocation, distribution, or drainage of water.”⁷⁰ And this reflected, at least in part, the reluctance of engineers to formally involve them in playing such roles.

Equally important, where such organizational interventions *did* spark broader local initiative in water matters, this initiative often developed in intersection with

the same local patronage and biradari structures that had long sparked engineering wariness with respect to warabandis. This process was perhaps most clearly documented in anthropologist Douglas Merrey's detailed analysis of the continuing role of biradari and patronage-based honor (izzat) and inequality in shaping state-initiated irrigation reforms during the 1970s in an old canal colony chak of Sargodha district.⁷¹ As Merrey showed clearly, biradari and patronage-based connections continued to hold powerful resonance in local water control precisely because they offered leverage for many irrigators (notably the more locally powerful) to turn state-based initiatives to their own local political purposes—an old Indus basin phenomenon. But beyond this, local patronage structures and biradari-based idioms remained salient in significant part because they also linked local water politics to the provincial and national chains of political connection that were central to Pakistani governance, often in counterpoint to rationalizing policies such as those shaping WUA reforms.

Indeed, such developments pointed toward the growing problem of systemic “corruption” and how its particular Pakistani forms reflected the structure of the Indus basin water system.⁷² Corruption, of course, had many meanings and a complex history of commentary extending well back into the colonial era.⁷³ Most discussion during the British period had focused on the collusion between irrigators and low-level personnel in compromising engineering direction. But with the increasing attention to chak-level water use as a central concern in systemic policy, corruption in relations between the engineering bureaucracy and local-level irrigators encompassed not just subordinate departmental employees but also professional engineers themselves, increasingly caught between the “apolitical” ideology of water engineering and the pressures associated with the return of electoral politics to Pakistan in the late 1980s and 1990s.⁷⁴ As one engineer remarked in an interview with Mustafa in the late 1990s, “How can I take on the politicians in such an environment?”⁷⁵ Pressure from politicians on engineers was hardly a new feature of Indus basin irrigation. As we have seen, it dated back at least to the era before partition when elections were first introduced into provincial administration. But such pressures had now become acute, with illicit payments composing by the end of the century increasingly large percentages of many engineers' incomes.

Engineers had hardly lost their professional identities. But with apolitical, professional engineering principles—and bureaucratic administration—long conceptually separated from the politics of local forms of influence based on biradari patronage and “natural” community, local irrigators, cut off from any formal influence within the system's “public” structure, increasingly exerted influence in the system in other ways, deploying networks of illicit payments to facilitate tampering with outlets and stabilizing (or increasing) their supply. By the last decade of the century, this process had developed its own momentum: as water deliveries

became more unreliable and unpredictable, the importance of payments for manipulating supply increased, which only further heightened the uncertainties that gave salience to patronage and biradari politics.

The World Bank, Markets, and Systemic Reforms

Government efforts to mobilize local communities through local WUAs were, not surprisingly, invested in this context with different meanings by different constituencies, not just with respect to their roles in irrigation, but with respect to their relationship to larger visions of political order. For some, including many in the growing world of NGOs, local community mobilization was linked in the 1980s to an international political discourse of “participatory development” and “grassroots democracy,” pointing toward greater democratization in society as a whole. For others, the WUA experience suggested the need to apply the latest social science principles of rational choice and institutional “design” associated with worldwide studies of “common pool” resource management.⁷⁶ But the most powerful external intellectual influence on ideas relating to the roles of communities in shaping irrigation in Pakistan in these years came from “neo-liberal,” market-oriented thinking, a global post-Cold War ideology brought to Pakistan by its development donors in the late 1980s and early 1990s, particularly the World Bank.⁷⁷ Seen through the lens of neo-liberalism, the problems tracking WUA reforms had far less to do with the complex historical roles of communities in Indus basin statecraft than they did with a universalizing theoretical contrast between individual, market-based initiatives, on the one hand, and the stifling consequences of an over-reliance on the state, on the other, a distinction with potentially powerful political implications.

Neo-liberals were hardly oblivious to the role of the state in a reformed, market-oriented order. Indeed, neo-liberal thinking was, in practice, closely linked with another new trend in social science at this time, the “new institutional economics,” an approach to economic actions that emphasized the importance of institutions, including the state, in the structuring of individual actions. From this perspective, even as markets were emphasized, the role of the state remained critical in fostering the institutions and rules (that is, structures of “governance”) that could facilitate market exchange by enhancing transparency and by lowering transaction costs at all levels. In this, the local community was widely perceived as a vital institutional source of “social capital.”⁷⁸ But to fulfill the expectations associated with such a view of community required its purpose to be reoriented, as new critiques of the shortcomings of the WUAs now made clear. “It is not enough to try to create a *sense* of local ownership in WUAs,” two development experts wrote in the early 1990s. “The organizations must *belong* to the water users in fact.”⁷⁹ Individual initiative had to be paramount. Local communities could no longer be understood, in other words, simply as “resources” serving the interests of a fundamentally state-directed (and expert-driven) system but rather as vehicles for giving individual incentives meaning.

What gave these new intellectual directions particular traction in Pakistan at this time, however, was their intersection with the long-developing sense of crisis in Indus basin water management that had followed the end of the IBP. By the 1990s, with shortages becoming increasingly acute and finances continuing to deteriorate, old problems took on new urgency.⁸⁰ “Ineffective management of the irrigation system, financial non-sustainability and inequitable distribution of water resources” were responsible, as one report noted, for a climate in which the very “viability of irrigated agriculture” in Pakistan was being called into question.⁸¹ The moment was ripe, in other words, for a new conception of the management of nature, in this case based on transparent rights and markets, to penetrate into the management of the Indus basin water system—just as had been the case in the nineteenth century with the advent of professional water engineering during the consolidation of British colonialism (at a critical moment as well in the global evolution of ideas of political economy) and in the mid-twentieth century with the coming of new visions of apolitical “developmentalism” in the wake of partition and the advent of the Cold War.

It was perhaps ironic that it was the World Bank that led the way. If it was the bank that had pointed the way toward a highly technicalized, state-controlled water development strategy in Pakistan in 1954 (when it first recommended the virtually complete separation of the Indus basin waters into unified and discrete “national” segments), it was now the bank that spearheaded the radical reformulation of this vision, drawing on a neo-liberal vision of free market universalism that transcended the nation. Critically, the history of private tubewell development in Pakistan provided an indigenous model on which to build. Different forms of tubewell ownership now seemed to crystallize the contrast between the dynamism of private initiative and the congealed rigidity of state-led development. By the 1980s, *public* tubewells, controlled by state managers, had entered a steep performance decline, their problems in operation and maintenance now so marked that they were widely viewed as a key source of the financial stringency dragging down the entire state delivery system.⁸² In sharp contrast, the ongoing spread of *private* tubewells had led to what one analyst now called “spontaneous water market development.”⁸³

In 1994, the bank thus proposed a sweeping new reform program for Pakistan’s irrigation sector, aimed at moving toward greater reliance on water markets through large-scale institutional and legal reorganization. To harness the vital—if still “anarchic”—structure of private tubewell investment (as one bank report put it), the bank proposed to bring order to the system through the establishment of enforceable property rights in water at all levels. The clarification of fixed “rights,” which had been viewed as so problematic by generations of colonial engineers (and as a potential conceptual threat to a system theoretically defined by engineering adaptation to the laws of nature), was now seen as central to the overall development of a governmental structure—and a structure of communities—that

offered the ultimate potential for irrigation water to be, in the words of one expert, “commercialized and later privatized.”⁸⁴

This is not to suggest that such ideas were accepted in 1990s Pakistan without controversy. Some critics pointed to the serious technical constraints holding back the commodification of water; volumetric water delivery to individual users had never been the practice in the Indus basin, and it was not clear to many how a system of volumetric water entitlements could now be technically established.⁸⁵ On a political level, the challenges to the reforms were even more basic, coming from both politicians and engineers. For many people, personal influence and income were at stake. The threat was not simply to private income but also to longstanding professional engineering principles shaping the very idea of a “public” system, a system that projected a common community of water users integrated by the knowledge and organization of bureaucrats and engineers.⁸⁶ As two prominent engineers now wrote, “[T]he basic requirement[s] of the proposed concept, i.e. individual water rights and free water trading are not compatible and operable in Pakistan’s environment.” To the contrary, they declared, “The introduction of individual water rights could upset the age-old water discipline, and the possibility of its misuse by the influential and big landlords is quite real in the context of local setting.”⁸⁷

But facing pressure from international creditors in a time of financial duress, the government of Pakistan accepted in the mid-1990s the basics of the bank’s reformist approach. Its acceptance of neo-liberal principles was hardly total. The government resisted some of the bank’s most sweeping proposals for water privatization, refusing to alter, for example, the *formal* structure of state ownership of water under the Canal Act. But it nevertheless finalized legislation in 1997 to fundamentally reorganize the irrigation bureaucracy and to conceptually restructure the role of communities within the irrigation system, based on a new, integrative structure of water entitlements and incentives.⁸⁸ New, autonomous Provincial Irrigation and Drainage Authorities were formed, within which irrigation management was significantly decentralized into the hands of smaller Area Water Boards, linked to the hydraulic structure of canal commands.⁸⁹ Paralleling this bureaucratic realignment, legislation authorized the formation of “farmers organizations” quite different from the WUAs of the 1980s. These were to be not simply chak-based community institutions (juxtaposed against a technical, bureaucratic structure operating across the outlet) but rather vertically linked user organizations intersecting with bureaucratic authority at every level of the hydraulic structure, from the local chak watercourse (where elected “*khal panchayats*” [watercourse associations] were to be established) to the distributary level (where a management committee was to be elected by all the panchayat chairmen) up through Area Water Boards at the canal command level, which included both elected “farmer members” and “technical experts.” The bank’s plan defined a theoretical charter, in other words, for irrigator influence to formally and directly trespass on what had previously been—since the

time of the Canal Act's passage—the distinctive and separate realm of engineering knowledge and control on the main surface delivery system.⁹⁰

These reforms hardly instituted a fully market-based approach to irrigation, for they fell well short of establishing clear, individual property rights in water. Nor were they implemented quickly or uniformly. Indeed, they were only extended to local levels in Pakistan over the next decade (and subsequently) in gradual and piecemeal ways.⁹¹ But their passage nevertheless acknowledged, in effect, the failure of a historically deep-seated “public” vision of river basin management, dating all the way back to the ideas of nineteenth-century engineers. Indeed, it was precisely as an antidote to the failure of this public, engineering vision—rooted in an imagined community of producers disciplined by the laws of nature (but in reality dominated by an engineering bureaucracy)—that a new vision of a system disciplined by the laws of the market (and by rights-bearing individuals organized into communities to protect their interests) was now projected. Whatever their limitations, the reforms thus embodied a vision that drew heavily on neo-liberal faith in the ultimately transformative power of market incentives.

But as their practical implementation made clear, the neo-liberal meanings attached to markets belied the more complicated historical place that water markets had long held within the conceptual binaries shaping Indus basin irrigation. Under the Canal Act, water buying and selling had been strictly forbidden, reflecting the logic of the public delivery system, within which *all* irrigation water technically “belonged” to the state and was provided to irrigators only for productive “use” (an assumption linked to a water-pricing structure tied not to quantities of water but to irrigated crop returns). It was against this backdrop that neo-liberal reforms projected the need for market-based change. But, in actual practice, water selling and buying had hardly been historically unknown in Indus basin irrigation. Yet water selling and water exchange had operated in a realm legally separate from the Canal Act's statutory dictates—that is, in the realm of “custom.” No water controllers had been more active in legal water selling under the colonial regime than the old water lords, who operated outside the purview of the Canal Act. Within this context, water “rights,” as frames for transactional exchange, had taken on distinctive cultural and political meanings quite different from those associated with the socially abstracted, universalizing visions of individual water “rights” that shaped the aspirations of neo-liberal reformers.

The competing meanings of markets and rights were suggested by the contrasting cultural images projected onto private tubewell developers as market-based reforms were developed. For many reformers, such men were exemplars of the entrepreneurial spirit that they saw water markets as unleashing. The actions of tubewell developers, who expanded the local water supply by selling groundwater to others, dramatized the power of market incentives to spur local water development. Though private tubewell entrepreneurs generally came from the “wealthier

farmers in Pakistan's Punjab," as one study put it,⁹² their very engagement in market relations was widely viewed as conducive to the general good, because they distributed water, through the mechanism of price, to those most capable of putting it to productive "use." This was the genius of the market mechanism. Analysts were hardly oblivious, of course, to the self-interests driving such locally influential tubewell developers. And most realized well that the operations of groundwater markets—and the positions of powerful men within them—were subject to widespread local variation.⁹³ Yet their efforts nevertheless tended to be seen as conducive, almost by theoretical definition, to the ultimate good. As one analyst put it, "By expanding access to groundwater, water markets had the power to "increase equity as well as productivity of irrigation."⁹⁴

For those with long experience in Indus basin water management, however, such "private" control over water could look quite different. Whatever the role of such men in expanding water availability, with private water-selling long forbidden under the Canal Act in the name of "public" water management, the association of open water selling with the "wealthier farmers" harked back to an era when "big men," like water lords, had included water control and water selling in their larger repertoires of patriarchical power. Cast in these terms, water selling was hardly the model for a new vision of society transformed by individual incentives and choice; the neo-liberal vision of markets and rights looked far more like an idealistic aspiration—and one in pervasive tension with the historically and culturally embedded visions of customary rights that had shaped the evolution of Indus basin politics.

New aspirational visions of community, transcending the power of patronage and of local idioms of tribe, custom, and biradari, had of course galvanized Indus basin society many times before. Transformative visions of change had influenced the original development of the Punjab canal colonies at the end of the nineteenth century. Indeed, powerful aspirational visions of community had shaped the foundations for the Pakistani nation itself, a community whose ideals were in turn mobilized in support of a new level of "national" technical control over the river basin. Yet, however powerful such aspirations had been, they had always operated in practical counterpoint to the continuing influence of more parochial forms of patronage and community—which remained firmly entrenched and central to the state's stability. And this structural tension had hardly disappeared as new neo-liberal visions of individual-based transformation were brought into play.

The legal fate of customary law in Pakistan provides a good example of the tensions such aspirational projects had long generated—and continued to generate—in Pakistani society. As a source of formal law, "custom" was officially abrogated in Pakistan following the country's creation in 1947, its supersession by shariat in matters of personal law a sign of a new Pakistani nationhood that transcended the politics of local particularisms, regionalism, and blood.⁹⁵ But in practice, as

Matthew Nelson has shown, “custom” in inheritance matters continued to function—even half a century after 1947—as a bedrock of social order in Punjab, with the exclusion of women from landed inheritance continuing to define the local genealogical and patriarchal authority that underlay the authority of most local landed power holders. As Nelson argues, the structure of elections in late twentieth-century Punjab had come to be precisely geared toward the election of local political leaders who could be expected to protect landholders from the practical operation of shariat—even, ironically, as they widely supported its recognition as a symbolic, aspirational marker of national, Islamic community.⁹⁶

It is not very difficult to see Indus basin irrigation reforms in a similar light. On one level, the appeal to markets pointed toward a broader, more integrated vision of Pakistani state and society in general. It promised for some observers a new “state-society synergy” based on the reform of the bureaucracy, on the one hand, and a newly emerging “civil society,” tied to the growth of new media and a growing middle class, on the other.⁹⁷ Irrigation reform was easily cast in this framework as a leading sector in social change, which held powerful promise for a transformed Pakistan. New commitments to individual initiative in water policy had the potential power to break apart older forms of patronage and community, providing new foundations for social integration and progress. But old structures of biradari and patronage were hardly relics of a backward past simply waiting to be superseded. They were instead legacies of a nineteenth-century colonial structuring of communities shaped by the very principles of modern political economy—and the juxtaposition of different forms of community rooted in competing relations to nature—that had made the environmental transformation of the Indus basin possible. Juxtaposed against this history, it is hardly surprising that markets and transparent water entitlements remain aspirations bound up both with the pressures of Pakistan’s dependent place in an international order and with its own distinctive Indus basin past.

CONCLUSION

Behind all of this, of course, remains the continuing power of nature to shape the Indus basin. No one—whether reformers or their critics—has denied the continuing centrality of systemic understandings of nature (and the river basin) to making the irrigation system work.⁹⁸ This has been all the more true in an era of climate change. If global processes have shaped international intellectual trends, they have also shaped the natural processes that have rendered the rivers of the Indus basin “at all times very much alive,” as Gerald Lacey put it half a century earlier—even in an Anthropocene age.⁹⁹

This was dramatically driven home by the Indus basin’s catastrophic floods of 2010. Caused primarily by extremely heavy monsoons, the July and August floods

of that year breached major embankments in both Punjab and Sind and caused widespread destruction. For many, there was a strong sense that nature itself was now speaking. As the Punjab government's judicial inquiry into the floods put it in the title of their report, the floods were "a rude awakening."¹⁰⁰ Some twenty million people were affected, with almost two million homes destroyed or damaged, 1.6 million head of livestock dead, and total economic losses approaching US\$43 billion.¹⁰¹ Though the consensus was that the scope of these floods, while extraordinary, was not outside the parameters of historical variation, they were nevertheless widely viewed as a commentary on the Indus basin's increasing susceptibility to nature's power.¹⁰² Indeed, with greater climatic uncertainty surely looming, some analysts argued for the growing need to sensitize Pakistani water managers to the importance of adaptation to "the rhythms of the Indus basin rivers, instead of maintaining the attitude of heroic engineering" to control them.¹⁰³ Yet no message was more powerfully conveyed by the floods' damage than that massive human development had vastly increased the system's vulnerabilities, for the floods involved population sizes and quantities of cropped land now susceptible to flooding that would have been unthinkable even at the time of the Indus Waters Treaty fifty years earlier.

As the various inquiries into the floods suggested, the heart of the question related to the connections between nature and statecraft. Central to inquiries on the floods undertaken in Pakistan at both the federal and provincial levels was a focus on the stresses facing the engineering bureaucracy, caught between a theoretically apolitical commitment to bureaucratic discipline and science, and an ongoing agenda of market-based reform. Yet behind all these pressures lay questions relating to the legitimacy of Pakistan's statecraft itself. As more than one commentary implied, what was breached when the Indus spread destructively over the countryside of the Punjab, Sind, Khyber Pakhtunkhwa, and Baluchistan were not just river embankments but the principles defining the state's authority.

Most important for the official inquiries that followed the floods was to maintain the legitimacy of the state's power, even as the reports critiqued the specific failures of government planning and personnel that had abetted the 2010 catastrophe. This emphasis was reflected in myriad ways, not least in strong recommendations for a *comprehensive* national flood plan as a response to what had happened. "To our dismay," the Punjab Judicial Flood Inquiry Tribunal declared, "we found out that since independence" the government had not developed any "integrated Flood Management Plan for the country."¹⁰⁴ The floods provided a moment for reasserting the continuing normative importance of a knowledge-based frame for control of the river basin—that is, a frame for the projection of a common community of production linked to a control over, and adaptation to, nature that both legitimized the state and bound it to society.¹⁰⁵ Indeed, these legitimizing claims were cast by the Pakistan government in the language not only of

science but of religion as well, as reflected in the Flood Inquiry Commission's opening of its report with a quote from the Surah al-Baqra in the Quran, suggesting that it was the desire of God himself that nature be used for man's productive benefit, something readily evident to all "who possess wisdom and rational intellect."¹⁰⁶

If the seeming failures of this vision before and during the floods lay in part in multiple bureaucratic problems and incompetencies, they also lay in the operation of "politics" in a much broader sense—and in its relationship to the social foundations of the state. As the central Flood Inquiry Commission put it, most breaches in Indus embankments were the result not only of "serious organizational and managerial issues impinging upon professionals' apathy" but also of "widespread corrupt practices in the hierarchy" and a culture of "canal water distribution under political influences."¹⁰⁷ Charges of the breaching of bunds based on political considerations—often to save land in one area by directing floods to another—were widespread in the evidence, and these charges implicated landowners, officials, and politicians alike. Some involved tensions in water management echoing back more than a hundred years, as in the claims before the Punjab Judicial Flood Inquiry Tribunal that the left bank Indus embankments above the Taunsa barrage had been deliberately breached in order to save the lands of prominent landholders in Dera Ghazi Khan district, most of whose ancestors we encountered in chapter 2.¹⁰⁸ Others seemed to implicate elected ministers, as in charges relating to the catastrophic failure of the *Tori band* in Upper Sind.¹⁰⁹

To call this "corruption" was a way to label it as violative of the norms of a community linked to the control of nature for the general good. But it was also reflective of a form of politics long intimately related to local autonomy, relations of patronage, *biradari*, and the stabilization of political order. These were concerns no less significant to the state—and to forms of political order—than the mobilization of a vision of community linked to the productive control over nature. The tensions embodied in a structure of statecraft drawing on antithetical forms of community—linked to nature as a force both acting and acted upon—had long defined the dynamics of the Indus basin's history as its modern landscape was remade. As the story of the Indus basin's spectacular environmental transformation over the past century and a half—and of its ongoing productive vulnerabilities—continues, such tensions are not likely to soon disappear.

NOTES

CHAPTER 1. INTRODUCTION

1. The best general work on the history of the Indus basin irrigation system up until the 1960s remains Aloys Michel, *The Indus Rivers: A Study of the Effects of Partition* (New Haven: Yale University Press, 1967).

2. For an overview of these arguments, see M. Mufakharul Islam, *Irrigation, Agriculture and the Raj: Punjab, 1887–1947* (Delhi: Manohar, 1997). The argument that dramatically expanding production did not produce “capitalist” transformation has been made in particular by Mridula Mukherjee, *Colonizing Agriculture: The Myth of Punjab Exceptionalism* (New Delhi: Sage Publications, 2005), and Imran Ali, “Malign Growth? Agricultural Colonization and the Roots of Backwardness in the Punjab,” *Past and Present* 114, no. 2 (1987): 110–32.

3. Gerald Lacey, “India and Pakistan,” in *Irrigation in Egypt and the Sudan, the Tigris and Euphrates Basin, India and Pakistan*, ed. Frederic Newhouse, M. G. Ionides, and Gerald Lacey, 33–67 (London: Longmans Green, for the British Council, 1950), 67. Gerald Lacey was Chief Engineer, United Provinces, and Principal at Roorkee College, 1945–46.

4. Sir Douglas Harris, “Foreword,” in Newhouse, Ionides, and Lacey, *Irrigation in Egypt and the Sudan*, v.

5. Lacey, “India and Pakistan,” 66.

6. *Ibid.*, 67.

7. A number of scholars have explored the cultural place of irrigation within larger conceptions of rule. For an attempt to analyze the “cultural economy” of irrigation, see David Ludden, “Ecological Zones and the Cultural Economy of Irrigation in Southern Tamilnadu,” *South Asia* 1, no. 1 (1978): 1–13.

8. “One of the chief vehicles of the sovereign gift in the Tamil country,” Pandian writes, “was irrigation.” Anand Pandian, *Crooked Stalks: Cultivating Virtue in South India* (Durham, N.C.: Duke University Press, 2009), 196–99. See also Anand Pandian, “An Ode to an

Engineer,” in *Waterlines: The Penguin Book of River Writings*, ed. Amita Baviskar (Delhi: Penguin, 2003), 12–27.

9. *Chenab Colony Gazetteer, 1904* (Lahore: Civil and Military Gazette Press, 1907), 34–35.

10. Muhammad Shah, lambardar of Gurdittiwala, “Shukriya Anhar Ferozepore” [Thanksgiving for the Ferozepore Canals], in *Ferozepore District Gazetteer, 1915* (Lahore: Government Printing, 1916), appendices (in Punjabi, with English translation), xxxv–xxxviii.

11. For more on Grey’s case, see chapter 4 in this volume.

12. Karl Wittfogel, *Oriental Despotism: A Comparative Study of Total Power* (New Haven: Yale University Press, 1957). For a good, brief discussion of Wittfogel’s views and their continuing relevance in studies of water control, see Donald Worster, *Rivers of Empire: Water, Aridity and the Growth of the American West* (New York: Pantheon Books, 1985), 22–30. Such power defined “hydraulic societies,” to use Wittfogel’s term—a term used by some to analyze the modern Indus basin as well. See, e.g., Imran Ali, “The Historical Lineages of Poverty and Exclusion in Pakistan,” *South Asia: Journal of South Asian Studies* 25, no. 2 (2002): 33–60.

13. The critique of Wittfogel has taken many forms. Wittfogel’s Cold War preoccupations led to a reaction against many of his conclusions, not least because of the limited historical evidence that he could adduce to support a direct connection between large-scale irrigation works and centralized, despotic power. Various historical studies subsequently suggested the variety of political forms associated with water management in different historical periods and different geographic contexts. See, e.g., Robert McC. Adams, Theodore Downing, and McGuire Gibson, eds., *Irrigation’s Impact on Society* (Tucson: University of Arizona Press, 1974).

14. Erik P. Eckholm, *Losing Ground: Environmental Stress and World Food Prospects* (New York: Norton, 1976), 21, 119–24.

15. “If modern irrigation has a birthplace,” she writes, “it is almost certainly the Punjab.” Sandra Postel, *Pillar of Sand: Can the Irrigation Miracle Last?* (New York: W.W. Norton, 1999), 44.

16. *Ibid.*, 91.

17. Such moral evaluations of the overreach of modern knowledge and state power have, of course, long influenced a wide range of writings, perhaps most recently James Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1999). References to Faust and to a “Faustian bargain” have been a recurring trope in such morality tales. See, e.g., Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002), 34.

18. Worster, *Rivers of Empire*, 57.

19. See, e.g., Rohan D’Souza, “Water in British India: The Making of ‘Colonial Hydrology,’” *History Compass* 4, no. 4 (2006): 621–28. D’Souza also argues that there was a distinctive form of colonial capitalism shaping colonial environmental history. Rohan D’Souza, *Drowned and Dammed: Colonial Capitalism and Flood Control in Eastern India* (New Delhi: Oxford University Press, 2006), 13–16.

20. See, e.g., the debates between Elizabeth Whitcombe and Ian Stone about the relative benefits of irrigation in India, given its health costs and negative externalities. Elizabeth Whitcombe, *Agrarian Conditions in Northern India* (Berkeley: University of California

Press, 1972), and Ian Stone, *Canal Irrigation in British India: Perspectives on Technological Change in a Peasant Economy* (Cambridge, Engl.: Cambridge University Press, 1984).

21. D'Souza details this turn in writing on water in colonial India; see "Water in British India," 623–24. It is important to note that this was hardly confined to India but was a significant turn in water studies internationally as well.

22. Stig Toft Madsen, ed., *State, Society and the Environment in South Asia* (London: Curzon Press, 1999), 3. For an analysis of the relation between environment and governmentality (and a call for a new approach to it), see also Arun Agrawal, *Environmentality: Technologies of Government and the Making of Subjects* (Durham, N.C.: Duke University Press, 2005).

23. See, among many works, Vandana Shiva, *Ecology and the Politics of Survival: Conflicts over Natural Resources in India* (New Delhi: Sage Publications, 1991). The association of the colonial water bureaucracy with a distinctly masculine ethos has been elaborated more broadly by Margreet Zwarteven, "Questioning Masculinities in Water," *Economic and Political Weekly* 46, 18 (Apr. 30, 2011): 40–48.

24. Madhav Gadgil and Ramachandra Guha, *This Fissured Land: An Ecological History of India* (Berkeley: University of California Press, 1992).

25. This can be seen, e.g., in the history of Water Users Associations in irrigation management (which is discussed in chapter 7). There is now a vast literature on participatory development, though there has been some retreat in recent years from "grassroots" development as a model in the face of its now recognized failures as a panacea.

26. David Mosse, *The Rule of Water: Statecraft, Ecology, and Collective Action in South India* (Delhi: Oxford University Press, 2003).

27. One of the great contributions of recent scholarship has been an emphasis on the constructed character of fixed environmental categories and on the historical fluidity of relationships across supposed environmental boundaries. See, e.g., Sumit Guha, *Environment and Ethnicity in India, 1200–1991* (Cambridge, Engl.: Cambridge University Press, 1999).

28. Mosse, *Rule of Water*, 307.

29. Raymond Williams, *Keywords: A Vocabulary of Culture and Society* (New York: Oxford University Press, 1976), 65–66.

30. David Studdert, *Conceptualising Community: Beyond the State and the Individual* (Basingstoke: Palgrave Macmillan, 2006). Studdert pushes this idea further: "The entire history of sociology's engagement with community perfectly encapsulates the conflation of fear and hope that have always marked it as a discipline. . . . The fear that underlies sociology is the fear of social collapse, the loss of social cohesion, and it is a sullen fear as well, unspeakable, recurring, and, given the open-ended nature of the capitalist project, ever present and ultimately unresolvable" (27–28).

31. William Willcocks, *From the Garden of Eden to the Crossing of the Jordan* (London: E. and F.N. Spon, 1919), 18.

32. Sir William Willcocks, *Ancient System of Irrigation in Bengal and Its Application to Modern Problems* (1930; repr., New Delhi: B. R. Publishing Corp., 1984), 1. Willcocks's career and ideas are explored more fully in David Gilmartin, "Imperial Rivers: Irrigation and British Visions of Empire," in *Decentring Empire: Britain, India and the Transcolonial World*, ed. Dane Kennedy and Durba Ghosh (Delhi: Orient Longman, 2006), 76–103.

33. See Francois Molle, "River-basin Planning and Management: The Social Life of a Concept," *Geoforum* 40, no. 3 (2009): 484. Ludwik Teclaff traces the concept of the "river

basin” in its modern English usage to the last quarter of the nineteenth century; see “Evolution of the River Basin Concept in National and International Water Law,” *Natural Resources Journal* 36 (1996): 359.

34. Richard White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill and Wang, 1995). In fact, views such as Willcocks’s tended to merge in the late nineteenth century with a more generalized, utilitarian vision of a common community of material interest, with individual productive rationality its heart.

35. A massive literature exists on this, extending through discussions of literature, race, identity, aesthetics, and so forth.

36. See, e.g., David Arnold, *The Tropics and the Traveling Gaze: India, Landscape, and Science, 1800–1856* (Seattle: University of Washington Press, 2006).

37. For a recent analysis of Maine’s thinking and its importance to the concept of empire, see Karuna Mantena, *Alibis of Empire: Henry Maine and the Ends of Liberal Imperialism* (Princeton: Princeton University Press, 2010).

38. Sir Henry Sumner Maine, “The Effects of Observation of India on Modern European Thought,” in his *Village-Communities in the East and West* (London: John Murray, 1871), 224, 232.

39. Such notions of competing visions of community were closely linked to ideas about the competing sides of human nature. See, e.g., Emile Durkheim’s essays “The Dualism of Human Nature and its Social Conditions” (1914) and “Organic Solidarity and Contractual Solidarity” (1893) in *Emile Durkheim; On Morality and Society*, ed. Robert Bellah (Chicago: University of Chicago Press, 1973), 149–166, 86–113.

40. For larger framings of the spatialization of community in South Asian history, see Guha, *Environment and Ethnicity in India*, and Sumit Guha, *Beyond Caste: Identity and Power in South Asia, Past and Present* (Leiden: Brill, 2013), 45–82.

41. Richard H. Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600–1860* (Cambridge, Engl.: Cambridge University Press, 1995).

42. See, e.g., Lynn K. Nyhart, *Modern Nature: The Rise of the Biological Perspective in Germany* (Chicago: University of Chicago Press, 2009), and Trevor Pearce, “From ‘Circumstances’ to ‘Environment’: Herbert Spencer and the Origins of the Idea of Organism–Environment Interaction,” *Studies in History and Philosophy of Science, Part C: Studies in History of Biological and Biomedical Sciences* 41, no. 3 (Sept. 2010): 241–52.

43. Gerald Lacey, discussion of paper on “Engineering Problems in Recent River Valley Projects in India” by K. L. Rao, in Institution of Civil Engineers, “Discussion: Engineering Problems in Recent River Valley Projects in India,” *ICE Proceedings* 12, no. 4 (1959): 463.

44. H. L. Uppal, “Hydrological Balance of the Indus Basin,” in *Land and Water Management in the Indus Basin (India)*, vol. 1, *Land and Water Resources* (Ludhiana: Punjab Agricultural University, 1978), 15, 18.

45. For a discussion of the shifting courses of the Beas, Sutlej, and Ravi during the Mughal period, see Irfan Habib, *The Agrarian System of Mughal India* (New York: Asia Publishing House, 1963), 29–31.

46. See, e.g., D. A. Holmes, “The Recent History of the Indus,” *Geographic Journal* 134, 3 (Sept. 1968): 367–82. An overview of scholarship on old courses of the Indus (with maps) is provided by Gregory L. Possehl, “The Indus Civilization and Riverine History in North-

Western India and Pakistan,” in *A History of Water*, series II, vol. 2, *Rivers and Society: From Early Civilizations to Modern Times*, ed. Terje Tvedt and Richard Coopey (London: I. B Tauris, 2010), 29–51.

47. The nature of riverine agriculture based on annual inundations is discussed in many of the Punjab and Sind settlement reports. For the severe uncertainties associated with flood-based agriculture in some areas, see “Irrigational Settlement of the Ghotki Taluka of Shikarpur District in Sindh, 1895,” Rev. & Agric (Revenue), Sept. 1897, pt. B, #35, National Archives of India [hereafter NAI].

48. Extracts from the gazetteers and settlement reports of Hissar and Sirsa. Punjab Board of Revenue [hereafter BOR], file 251/282 (“Extension of Well Cultivation in the Punjab,” Precis of information prepared by R. Sykes, Director of Land Records, Punjab, about wells for the Indian Irrigation Commission), pp. 1–2.

49. For a discussion of the migrations between the hills of Afghanistan and the Indus plains, see Daniel Balland, “Nomadism and Politics: The Case of Afghan Nomads in the Indian Subcontinent,” *Studies in History* 7, no. 2 (1991): 205–29.

50. This oversimplifies the complexity of these movements. See Neeladri Bhattacharya, “Pastoralists in a Colonial World,” in *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia*, ed. David Arnold and Ramachandra Guha (Delhi: Oxford University Press, 1995), 49–85.

51. Irfan Habib, “Technological Changes and Society, 13th and 14th Centuries,” Presidential Address, Medieval India Section, 31st Session, Varanasi, 1969, in *Proceedings of the Indian History Congress* (Patna: Indian History Congress, 1970), 149–55. There is some debate on the timing of the introduction of the Persian wheel. Iqtidar Husain Siddiqui sees its introduction as occurring slightly earlier than does Habib. Iqtidar Husain Siddiqui, “Water Works and Irrigation System in India during Pre-Mughal Times,” *Journal of the Economic and Social History of the Orient* 29, no. 1 (Feb. 1986): 66.

52. Chetan Singh, “Well-irrigation Methods in Medieval Panjab: The Persian Wheel Reconsidered,” *Indian Economic and Social History Review* 22, no. 1 (1985): 73–87.

53. J.S. Grewal has suggested, based on early references to rope and pulley, that “presumably, oxen were used to draw the rope over [the] pulley-wheel to lift water out of the well for irrigation” as early as the Vedic period. But this seems quite unlikely on a large scale. J.S. Grewal, “Historical Geography of the Punjab,” *Journal of Punjab Studies* 11, no. 1 (2004): 5.

54. The labor-saving advantages of the Persian wheel, as compared with the charsa, are suggested by comments in a late nineteenth-century Jullundur settlement report. It noted that three men were normally required to run a charsa (“one to attend to the bucket, another to drive the bullocks, and the third to attend to the flow of water in the beds in which the field is divided”), whereas a Persian wheel could be worked by one man. Punjab BOR 251/282, p. 15 (Extract from Jullundur Settlement Report). Such advantages were confirmed by twentieth-century experiments, which found the Persian wheel to be the most economical form of well irrigation in the Punjab (before power-driven tube wells). Excluding labor costs, the per-acre irrigation costs of a charsa-run well and a Persian wheel were Rs. 1.36 and Rs. 1.13 per acre-inch of water, respectively, in otherwise similar conditions. But when labor costs were figured in, the relative costs were Rs. 2.30 for the charsa and Rs. 1.57 for the Persian wheel, thus making the labor-saving value of the wheel clear. Sir William

Roberts and S. B. S. Kartar Singh, *A Text Book of Punjab Agriculture* (Lahore: Civil and Military Gazette Press, 1951), 155–56, 160–61.

55. A good example of such an area would be Sialkot district, where, in the late nineteenth century, Persian wheels constituted the “vast majority” of water lifts in the district. Punjab BOR, file 251/282, p. 33 (Extract from Sialkot Gazetteer). Farther south, as one engineer noted of Multan in the 1870s, if the spring level was more than fifteen feet below ground, then well irrigation in general was unremunerative. E. A. Sibold, “Notes on the Multan Inundation Canals,” *Professional Papers of Indian Engineering*, 2nd series, vol. III (Roorkee: Thomason College Press, 1874), 41.

56. See “Report on the Assessment of the Shorkot and Jhang Tehsils,” Punjab Rev. Agric. & Commerce, Aug. 1881, #14, India Office Library and Records, British Library [hereafter IOL]. See also *Bahawalpur Gazetteer, 1904* (Lahore: Civil and Military Gazette Press, 1908), 289.

57. Bhattacharya, “Pastoralists in a Colonial World,” 59.

58. Irfan Habib, “Jatts in Medieval Punjab,” in *Precolonial and Colonial Punjab: Society, Economy, Politics and Culture*, ed. Reeta Grewal and Sheena Pall (Delhi: Manohar, 1992), 63–75.

59. See Chetan Singh, “Community and Conflict: Tribes and the ‘Agrarian System’ of Mughal India,” *Indian Economic and Social History Review* 23, no. 3 (1988): 319–40.

60. Examples of this appear in the settlement records from many districts. For one example, see *Jhang District Gazetteer, 1908* (Lahore: Civil and Military Gazette Press, 1910), 106.

61. As Gregory Possehl notes of the early Indus valley civilization, “One of the unresolved issues is whether significant canal irrigation works were associated with the Indus agricultural regime.” He notes some evidence of the use of check-dams to capture water in spate (seemingly similar to the ways these dams are used on hill torrents in a much later period). These may perhaps have been used on channels from rivers as well. Gregory L. Possehl, *The Indus Civilization: A Contemporary Perspective* (Walnut Creek, Calif.: Altamira Press, 2002), 64–65. Mark Kenoyer suggests that most irrigation on the alluvial plains in Harrappan times was by inundation (*sailaba*), with the water “diverted by temporary earthworks.” But he adds that “physical evidence for fields and irrigation systems is difficult to locate because of the meandering rivers and intense cultivation since the prehistoric period.” Mark Kenoyer, “The Indus Valley Tradition of Pakistan and Western India,” *Journal of World Prehistory* 5, no. 4 (Dec. 1991): 355.

62. For a discussion of the evidence of ancient canals in Bactria, see Gérard Fussman, “Southern Bactria and Northern India before Islam: A Review of Archaeological Reports,” *Journal of the American Oriental Society* 116, no. 2 (Apr.–June 1996): 243–59. For suggestions about the relationship between water control and state building in the mountains in the north of the Indus basin (in Hunza), see H. Sidky, *Irrigation and State Formation in Hunza: The Anthropology of a Hydraulic Kingdom* (Lanham, Md.: University Press of America, 1995).

63. Siddiqui, “Water Works,” 70–73.

64. Many of these projects were associated also with gardens, whose complex cultural connections to power in the region have been discussed in James L. Wescoat, Jr., “Landscapes of Conquest and Transformation: Lessons from the Earliest Mughal Gardens in India, 1526–1530,” *Landscape Journal* 10, no. 2 (Fall 1991): 105–14.

65. See Habib, *Agrarian System*, 252–53.

66. For a discussion of this canal, see David Gilmartin, “The Irrigating Public: The State and Local Management in Colonial Irrigation,” in Madsen, ed., *State, Society and the Environment*, 236–65.

67. Habib, *Agrarian System*, 34.

68. See Abha Singh, “Irrigating Haryana: The Pre-Modern History of the Western Yamuna Canal,” in *Medieval India I: Researches in the History of India, 1200–1750*, ed. Irfan Habib (Delhi: Oxford University Press, 1992), 49–61.

69. Indigo had apparently been grown in Sind in the seventeenth century, but with the silting up of Bandar Lahri, Sind’s port at the mouth of the Indus, in the early eighteenth century, its export had declined. Its subsequent spread in the mid-Indus valley thus appears to have been, at least in part, a product of the redirection of trade. See W. H. Moreland, *From Akbar to Aurangzeb* (London: Macmillan, 1923), 107–18.

70. Although this region had earlier witnessed the expansion of rabi cropping with the expansion of Persian wheels, running these wheels in the hot and dry summer months took its toll on bullocks—and limited sharply the areas on which kharif crops could be grown (particularly as well-watered land often had to be given over to produce fodder for well bullocks, too).

71. “Memorandum on the Cultivation of Indigo in the Multan District, written by Mr. Morris at the First Regular Settlement,” Appendix S to Charles Roe, *Report on the Revised Settlement of the Multan District of the Punjab, 1873–80* (Lahore: W. Ball, 1883), cxxiii–cxxxviii. For a discussion of the important role of indigo across the Indus, see also Lt. C. Minchin, Offg. DC, DGK to Sec. to Govt, of Punjab, 27 Aug. 1860, Punjab Revenue, 8 Sept. 1860, Procs. #55–58, Punjab Archives, Lahore.

72. F. W. R. Fryer, Settlement Off., D. G. Khan to Offg. Comm. & Super., Derajat Division, 11 February 1871, Appendix to Agriculture, Punjab Rev. & Commerce, Sept. 1872, A procs. #15, IOL. There were, of course, many variants on this process; this is a description of the common pattern in Dera Ghazi Khan.

73. R. Sandeman, DC, Dera Ghazi Khan to Comm. & Super., Derajat, 14 November 1867, Punjab Public Works, March 1868, A procs. #20, IOL. Sandeman was describing the proposed Gamul canal in Rajanpur tahsil; its proposed area was marked, he noted, by an estimated 1,500 silted-up wells (though this number reflected the fact that it was also the site of an earlier, silted-up canal). In some such cases, claims would be established to wells abandoned a half-century or more earlier.

74. F. W. R. Fryer, Settlement Off., D. G. Khan to Offg. Comm. & Super., Derajat Division, 11 February 1871, Appendix to Punjab Agriculture, Rev. & Commerce, Sept. 1872, A procs. #15, IOL.

75. “Account of the Manka and the Shorea Canal”; “Abstract of Deeds Connected with the Manka Canal”; and “Proceedings of a Meeting of Proprietors of Villages Irrigated by the Dingana Canal, 29 Oct. 1870,” F. W. R. Fryer, Settlement Off., DGK to Comm. & Super., Derajat, 11 Feb. 1871, Appendix to Punjab Ag., Rev. & Commerce, Sept. 1872, A procs., #15, IOL.

76. For a discussion of chakdari tenures, see Lt. H. James, “Report on the Summary Settlement of Shujabad,” 3 December 1849, Punjab Revenue, 2 Feb. 1850, #78–93, Punjab Archives, Lahore. The pervasiveness of such tenures in Multan is suggested by the statistics of the British settlements. See Charles Roe, *Assessment Report of the Shujabad Tehsil in the Revised Settlement of the Multan District.*, 1878 (Lahore: Punjab Government, 1879), and

Charles Roe, *Report on the Proposed Assessment of the Lodhran Tehsil, 1878* (Lahore: Punjab Government, 1879).

77. See “Report on the Commerce of Multan” by Lt. R. Leech, Foreign Dept. Procs (Pol.), 25 Sept. 1837, #90, NAI. See also Capt. J. E. Hollings, D. C. Leiah to G. J. Christian, Sec. to Bd. of Admin., Lahore, 21 May 1849, Punjab Revenue, 26 May 1849, #235–36, Punjab Archives, Lahore.

78. For a brief account of the Bahawalpur Nawabs and their canals, see Richard B. Barnett, “The Greening of Bahawalpur: Ecological Pragmatism and State Formation in Pre-British Western India, 1730–1870,” *Indo-British Review: A Journal of History* 15, no. 2 (1988). The connections between canal building and strategies of military consolidation are discussed in Richard B. Barnett, “Strategies Under Stress: Army Management and Environment in Late Pre-colonial Bahawalpur,” in *Warfare, Religion, and Society in Indian History*, ed. Raziuddin Aquil and Kaushik Roy (New Delhi: Manohar, 2012), 225–48.

79. The eighteenth-century construction of canals by competing branches of the Daudpotras and their eventual consolidation is discussed in the *Bahawalpur Gazetteer, 1904*, 53–57. The legacy of this was also evident in the parts of Punjab that had once been under Bahawalpur’s rule. Of the canals flowing in the Sutlej tahsils of Multan district in the mid-nineteenth century, nearly half owed their origins to various eighteenth-century Daudpotra chiefs. See J. H. Morris, “Report on the Inundation Canals of the Multan District,” 18 September 1858, Punjab Revenue, 11 December 1858, Procs. 9–14, Punjab Archives, Lahore. See also Mailsi Assessment Report, Punjab Rev. Agric. & Commerce, Oct. 1879, A procs., #9, Punjab Archives, Lahore.

80. There is considerable evidence of Sufi shrines playing important roles in irrigation management farther to the west and in central Asia. In the Indus basin, such roles, though sometimes important, seem to have been more limited. For one example in Afghanistan, see R. D. McChesney, *Waqf in Central Asia: Four Hundred Years in the History of a Muslim Shrine, 1480–1889* (Princeton: Princeton University Press, 1991).

81. *Muzaffargarh District Gazetteer, 1908* (Lahore: Government Printing, 1910), 27–29, 66, 246. The shrine itself is not mentioned in the 1908 gazetteer but is briefly noticed in the 1968 gazetteer; see *Muzaffargarh District Gazetteer*, volume A, comp. Naseer Muhammad Gardezi (Karachi: West Pakistan Government Press, 1968), 311.

82. The makhdums themselves thus gained considerable authority in the region, until their canal was disrupted by a major shift in the course of the Indus (which shifted Sitpur itself to the east side of the Indus). See chapter 2 for further discussion of this Indus shift. For a discussion of the Sitpur canal, see “Account of the Dhoundee and Noor Canals,” Appendix to Punjab Agric., Rev. & Commerce, Sept. 1872, A procs., #15, IOL; see also Munshi Hukum Chand, *Tawarikh-i Zilla Dera Ghazi Khan* (Lahore: Katoriya Press, 1876), 522–24.

83. Where possible, canal heads were located on side creeks, but, as this was not always possible, river action during the floods frequently damaged or destroyed heads, thus requiring their reconstruction. See *Multan District Gazetteer, 1901–02* (Lahore: Civil and Military Gazette Press, 1902), 311.

84. For a description of the chher system, see J. H. Morris, “Report on the Inundation Canals of Multan District,” Revenue, 11 Dec. 1858, procs. 9–14, Punjab Archives, Lahore. As the first British report of the civil engineer on the canals of Khangarh (later Muzaffargarh)

district put it in 1852: "It is imperative on the villages to furnish these laborers called cheers [*sic*], or to pay a fine in commutation of labor, the commutation is generally paid by the mercantile class who own lands, but seldom have much influence over the agricultural laborers" (Punjab Revenue, 16 October 1852, procs. 123–25, Punjab Archives, Lahore). The hired canal laborers came largely, at least in the early British period, from among the *pawindas*, migrants from Afghanistan, who came to the plains in the cold weather, often bringing animals for grazing as well. Sibold, "Notes on the Multan Inundation Canals," 353.

85. Sibold, "Notes on the Multan Inundation Canals," 353.

86. There is considerable discussion of the *chher* system in early British papers, particularly for Multan and Muzaffargarh. See J. H. Morris, "Report on the Inundation Canals of Multan District," Punjab Revenue, 11 Dec. 1858, procs. #9–14, Punjab Archives, Lahore. See also "Management of the Inundation Canals in the Muzaffargarh District," IOL, file P/876. The workings of the system—and its fate under the British—will be discussed in more detail in chapter four.

87. "Why Bahawal Khan's Canals Ran Well," in F. W. Skemp, ed. and trans., *Multani Stories* (1917; repr., Lahore: Panjabi Adabi Laihr, 1982), 17; for clarity, I have slightly altered Skemp's translation.

CHAPTER 2. IRRIGATION AND THE BALUCH FRONTIER

1. M. Longworth Dames, *Popular Poetry of the Baloches*, vol. I, Asiatic Society Monograph, no. 9 (London: Royal Asiatic Society, 1904), 196.

2. Robert Nichols's work on the Peshawar valley shows the importance of water control there too. See Robert Nichols, *Settling the Frontier: Land, Law, and Society in the Peshawar Valley, 1500–1900* (Karachi: Oxford University Press, 2001). For some indication of the long-standing importance of irrigation along the Peshawar frontier, see E. G. G. Hastings, *Report of the Regular Settlement of the Peshawar District of the Punjab* (Lahore: Central Jail Press, 1878), 271–86.

3. There is a growing literature on this, but see David Chappell, "Ethnogenesis and Frontiers," in "Forum: The Formation of Ethnic Identities in Frontier Societies," *Journal of World History* 4, no. 2 (Fall 1993): 267–75.

4. F. W. R. Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District, 1869 to 1874* (Lahore: Central Jail Press, 1876), 66.

5. Simanti Dutta, *Imperial Mappings in Savage Spaces: Baluchistan and British India* (Delhi: B. R. Publishing, 2002), 1.

6. Robert N. Pehrson, *The Social Organization of the Marri Baluch*, compiled and analyzed from his notes by Fredrik Barth (New York: Wenner-Gren Foundation for Anthropological Research, 1966), 4.

7. For a discussion of the divisions of time used for kalapani irrigation in the hills (though in an area occupied predominantly by Pakhtuns and Khetrans), see *Loralai District*, Baluchistan District Gazetteer Series, vol. II (Allahabad: Pioneer Press, 1907), 187–92.

8. In the case of the Legharis, e.g., as Minchin noted, the ancestral lands of the *tumandar* (chief) were "entirely dependent on hill streams for irrigation." Capt. C. Minchin, *Memo-randum on the Beloch Tribes in Dera Ghazi Khan District*, Selections from the Records of the Government of the Punjab, no. III, new series (Lahore: Punjab Printing Press, 1869), 20.

9. The subordination of these Hindu traders was indicated, among other things, by dress, but their protection was strongly linked to Baloch honor. Foreign Dept. Procs. (Pol A), June 1863, nos. 123–125 (Settlement of Sections of the Boogtee in the DGK Plains), NAI.

10. For a detailed discussion of the operation and construction of karez, see *Loralai District*, 180–86.

11. For a good description of the operation of rodkahi irrigation and its problems, see Henry St. George Tucker, *Report of the Land Revenue Settlement of the Dera Ismail Khan District of the Punjab, 1872–79* (Lahore: W. Ball, 1879), 5–8, 197–203.

12. The comment is from L. J. H. Grey, who worked on torrent irrigation in Dera Ismail Khan in the 1860s. F. Grey and C. Grey, eds., *Tales of Our Grandfather, or India since 1856* (London: Smith, Elder, 1912), 97–98.

13. Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District*, 59, 60.

14. Minchin, Offg., DC, DGK to Comm. & Super., Derajat, 16 November 1861, Punjab BOR, file 251/106 (“Purchase of the Nur and Dhundi Canals”), p. 10. Minchin added, however, that, during the lean years, “the zamindars must remain idle and unemployed,—a fruitful source of mischief,—unless they can obtain service in other parts of the country.”

15. M. L. Dames, DC, DGK to Comm & Super, Derajat, 17 April 1888, Punjab, Rev and Agric., Agric, A procs, #1, August 1888, IOL.

16. Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District*, 38.

17. As Minchin noted of the Khosa tumandar, when torrent cultivation failed in the *pachhad* (the settlement circle in which torrent cultivation predominated), he assisted “his distressed clansmen from his own granaries, making small money advances in addition.” Minchin, *Memorandum on the Beloch Tribes*, 12.

18. Fred Scholz, *Nomadism and Colonialism: A Hundred Years of Baluchistan, 1872–1972*, trans. Hugh van Skyhawk (Karachi: Oxford University Press, 2002), 56–63, 138–43.

19. Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District*, 61.

20. As Frank van Steenberg explains, Baloch “tribal organization” thus depended “as much on affiliation and the recognition of tribal leadership” as it did on descent—and the protection of access to resources was often critical to this process of affiliation. Frank van Steenberg, “Land, Water, and Ethnicity: Social Organization and Resource Management in Irrigated Communities in Balochistan,” in *Marginality and Modernity: Ethnicity and Change in Post-Colonial Balochistan*, ed. Paul Titus (Karachi: Oxford University Press, 1996), 254.

21. Pehrson, *Social Organization of the Marri Baloch*, 3. Scholz describes this process briefly in the case of the Marris: “The history of the Marri in terms of population, since the fifteenth century, was determined by constant affiliation of alien tribal in-groups”; such processes began with the inclusion of “alien elements” in feuds and economic life and led ultimately to inclusion in genealogical kinship. Scholz, *Nomadism and Colonialism*, 50–52.

22. M. Longworth Dames, *The Baloch Race: A Historical and Ethnographic Sketch*, Asiatic Society Monographs, no. 4 (London: Royal Asiatic Society, 1904), 47.

23. There were at least two separate waves of migration into the Indus basin, one in the thirteenth to fourteenth centuries that carried Baloch from Makran into Sind, and a second, in the fifteenth century, that took them into Punjab. Brian Spooner, “Baluchistan: Geography, History, and Ethnography,” *Encyclopedia Iranica* 3 (1988): 609.

24. Dames, *Popular Poetry*, xxiii.

25. Dames, *Baloch Race*, 47. The importance of the search for water as a critical trope in Baloch poetry generally is also suggested by Dames, *Popular Poetry*, xvii.

26. Inayatullah Baloch, *The Problem of "Greater Baluchistan": A Study of Baloch Nationalism* (Stuttgart: Steiner-Verlag-Wiesbaden-GMBH, 1987), 97.

27. For a discussion of the emergence of Baloch as a sort of military aristocracy under the Kalhoras and the Talpurs, see Richard Burton, *Sindh and the Races that Inhabit the Valley of the Indus* (1851; repr., Lahore: Khan Publishers, 1976), 235–37. According to Burton, the advent of the Baloch into the Kalhora aristocracy came in the 1740s when the Kalhora ruler, who also claimed religious authority as a pir (Sufi guide), induced two of his powerful Baloch murids (disciples) to settle in the low country.

28. In Sind, as compared with Punjab, continuing migrations strengthened tribal organization among Baloch in the eighteenth and nineteenth centuries, a fact reflected in the significant number returned who spoke Balochi in 1901. E. H. Aitken, *Gazetteer of the Province of Sind* (1907; repr., Karachi: Government Printing, 1986), 189. But even in Sind, as H. T. Sorley remarks, the Baloch tribes "have not retained an organisation, comparable among their neighbours in Baluchistan regions." H. T. Sorley, *The Gazetteer of West Pakistan: The Former Province of Sind* (Karachi: West Pakistan Government Press, 1968), 240.

29. Dames, *Baloch Race*, 48.

30. Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District*, 39.

31. *A'in-i Akbari*, trans. Col. H. S. Jarrett and corrected by Jadunath Sarkar, vol. II (1949; repr., Delhi: Low Price Publications, 1989), 331.

32. See Dames, *Baloch Race*, 34.

33. *A'in-i Akbari*, II: 333. The reference is actually to the "Dudai," which may include the Hot of Dera Ismail Khan and the Kolachi of Dera Fateh Khan as well as the Mirrani. Inayatullah Baloch cites Sujana Rai Batalwi, writing in the time of Aurangzeb, as noting that the Dodai commanded an army of 80,000 soldiers and 50,000 horsemen, a figure significantly larger than that given in the *A'in-i Akbari*. Baloch, *Problem of "Greater Baluchistan,"* 99–100. See also Muzaffar Alam, *The Crisis of Empire in Mughal North India* (Delhi: Oxford University Press, 1986), 143–44. None of these sources explicitly mention the building of canals.

34. F. W. R. Fryer, Settlement Officer, DGK to Comm & Super, Derajat, 11 February 1871, Punjab Agric., Rev & Commerce, A procs, September 1872, no. 15, Appendix, IOL.

35. R. B. J. Bruce, *Notes on the Dera Ghazee Khan District and Its Border Tribes*, Selections from the Records of the Government of the Punjab, no. IX, new series (Lahore: Civil Secretariat Press, 1871), 92; Major W. G. Davies, Officiating Settlement Comm., Multan and Derajat to Officiating Sec to Fin Comms, Punjab, 27 November 1874, Punjab Foreign Department, A Procs., August 1875, no. 41, IOL. According to Chand, "Haibat Khan Mirrani first had the canal dug from the river in the time of Nawab Ghazi Khan" (though it later became buried). Chand, *Tawarikh-i Zilla Dera Ghazi Khan*, 516.

36. Neither of these involved relations with the Mirranis but reflected the general pattern. Lepel Griffin and C. F. Massy, *Chiefs and Families of Note in the Punjab* (Lahore: Civil and Military Gazette Press, 1910), II: 334; F. W. R. Fryer, Settlement Officer, DGK to Comm & Super, Derajat, 11 February 1871, Punjab Agric., Rev. & Commerce, A procs, September 1872, no. 15, IOL.

37. F. W. R. Fryer, Settlement Officer, DGK to Offg. Comm. & Super., Derajat, 11 Feb. 1871, Appendix to Punjab Agric., Rev., & Commerce, #15, September 1872, IOL.

38. "Report by A. Burnes on the Trade of the Upper Indus, or Derajat," Foreign Dept. Procs., 25 September 1837, no. 94, NAI. Burnes noted that the numbers of Hindus and Muslims in Dera Ghazi Khan was about equal, as there were 125 temples and 110 mosques in the city. The role of Shikarpuri merchants and indigo trade is also discussed by Mohan Lall, who traveled through Dera Ghazi Khan to Shikarpur in 1836 and reported back to the Company. Foreign Dept. Procs., 1 August 1836, nos. 32–34, NAI.

39. This was the Gamooowala canal. Although its exact date of construction is not given in the documents, it was probably built in the late eighteenth century by a local zamindar, Gamoo Jhakkar. The first mortgage occurred about 1814. The second mortgage was to Mussoo Khan Nutkani. Punjab PWD, Civil Works, Irrigation, December 1868, A procs., #1, IOL.

40. Bruce, *Notes on the Dera Ghazee Khan District*, 33.

41. *Ibid.*, 43; Griffin and Massy, *Chiefs and Families of Note*, II: 363.

42. For comments on the historical origins of the tuman system in the eighteenth century, see Scholz, *Nomadism and Colonialism*, 52–53, 57.

43. The most likely date for the shift, according to the gazetteer, was 1787, though there is some disagreement in the sources on this. According to tradition, the shift was precipitated by the construction of the makhdum of Sitpur's canal, discussed in the introduction, into whose bed the river shifted. *Muzaffargarh District Gazetteer, 1908*, 5–6.

44. Bruce, *Notes on the Dera Ghazee Khan District*, 130.

45. The quotations are from "The Attack on Tibbi Lund," a ballad concerning a thirteenth-century AH conflict between the Tibbi Lund on the one side and the Gurchanis and Legharis on the other. The ballad, as Dames notes, "is probably the composition of a Dom or professional minstrel." Dames, *Popular Poetry*, 63–66.

46. Bruce, *Notes on the Dera Ghazee Khan District*, 32.

47. *Ibid.*, 22–23.

48. Minchin, *Memorandum on the Beloch Tribes*, 48.

49. Many Baloch had long been settled on irrigated lands on the Sind plains and had served the Kalhora and Talpur states. In fact, the Kalhoras had considerably expanded irrigation in the eighteenth century, particularly in Upper Sind, in part to provide canal lands for Baloch leaders whose assimilation to a military aristocracy was critical to the Kalhora state. Border affairs of the Talpurs were further complicated by their relations with the Brahui Khan of Kelat, who claimed authority over the Baloch tribes settled in the plain of Kachhi. For a larger discussion of sedentarization in this context, see Nina Swidler, "The Political Context of Brahui Sedentarization," *Ethnology* 12, no. 3 (July 1973): 299–314.

50. H. T. Lambrick, *John Jacob of Jacobabad*, 2nd ed. (Karachi: Oxford University Press, 1975), p. 35.

51. *Ibid.*, p. 381. But Lambrick, who spent much of his career in Sind, also added knowingly that such a vision of the Sindi peasant as an economic maximizer could "hardly fail to amuse anyone who has served in the province" (381).

52. These tribes, the Jakhranis and Dombkis, two Baloch tribes from Kachhi, were settled at Janidero in Upper Sind, where, in the later words of Aitken, Napier "hoped that they would reform and become peaceful husbandmen." Aitken, *Gazetteer of the Province of Sind*, 143.

53. Jacob found, e.g., that most "settlers" maintained control over their horses and continued to participate in occasional raids. Although the government had required them to

sell their horses, most had arranged sales to nearby zamindars who, in return for a share in plunder, kept the horses for the Baloch to use on occasional raids. He also found that these “settled” Baloch, like their hill brethren, maintained regular accounts with Sindi *banias* (Hindu moneylenders) for the disposal of plunder, usually in return for grain. Lambrick, *John Jacob*, 136–39.

54. S. P. Chablani, *Economic History of Sind, 1592–1843* (Bombay: Orient Longman, 1951), 28.

55. Lambrick, *John Jacob*, 138, 151, 237.

56. Foreign (Pol), 19 January 1855, nos. 268–269, NAI. A subsequent grant of land near Kashmir was also made to one of the leaders of the Dombkis in 1850, who resettled many of his followers on a tract opened by Baloch labor and irrigated through the clearance of another old canal. Lambrick, *John Jacob*, 240.

57. In 1851, the British reached agreements with the Bugti tumandar, allowing him to remain in the hills, and with those in Larkana, to return to the hills if they so wished, contingent on certain good conduct guarantees. In the end, about three-quarters returned to the hills. Foreign (A Political E) July 1883, nos. 267–340, NAI.

58. Lambrick, *John Jacob*, 270.

59. Bombay Public Works Dept., Irrigation, no. 50 of 1899 (Desert Canal, Remodelling project), Maharashtra State Archives, Bombay.

60. Subsequently, it was Lt. J. G. Fife who became the driving force in Sind canal affairs, and he who wrote the first comprehensive report in 1855 on the irrigation system of the province. Aitken, *Gazetteer of the Province of Sind*, 259. See also Capt. Walter Scott, *Economic Condition of Sind: State of Roads, Canals and Forests in 1846*, Selections from the Records of the Commissioner in Sind, #7 of 1844–47.

61. The formation of the new department was also part of a larger policy of establishing new Public Works departments at that time in the provinces of British India.

62. Bombay, *Official Correspondence on the Abolition of Statute or Forced Labour in Sind*, Selections from the Records of the Bombay Government, no. XXXIV, new series (Bombay: Bombay Education Society Press, 1856). For a discussion of the ultimate fate of Jacob’s reforms, see chapter 4.

63. Bombay, *Annual Police Report for 1868, Province of Sind*, Selections from the Records of the Bombay Government, no. CXVI, new series (Bombay: Education Society Press, 1870).

64. As Bruce wrote later in explaining the political importance of Desert canal grants, some of the Bugti headmen “occupy positions in the tribe which they consider they are bound under their tribal notions of honor to maintain and live up to.” And yet, “circumstances over which they have no control make it impossible for them to do this honestly or by fair means, so that wherever they find an opening for plunder, they do not allow it to escape them.” Income from agricultural lands on the plains tended to encourage them to break this cycle. Richard Bruce, Pol. Agent, Thal-Chotiali to Agent to GG in Baluchistan, 22 April 1883, Foreign (A Political E), July 1883, nos. 341–344, NAI. See also, for a history of debate on this question, Foreign (A Political E), July 1883, nos. 267–340, NAI.

65. F. R. Pollock, *Memorandum on the Dehra Ghazee Khan District, 1860*, Selections from the Public Correspondence of the Punjab Government, vol. IV, no. 4 (Lahore: Hope Press, 1860).

66. The 1856 flood was so severe that it was from this calamity that, a dozen years later, the residents of Dera Ghazi Khan calculated their dates. “The Dera Ghazi Khan Cantonment and Civil Station were swept away by this flood,” Fryer wrote, “and it reached some ten miles inland, demolishing villages and destroying the cattle and crops.” Three great *bands* were erected in this era: the Kala, Bahar Shah, and Shah Jamal embankments. The largest of these, the Kala embankment, was completed in time for the 1857 flood season at a cost of approximately Rs. 70,000. Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District*, 5.

67. Pollock, *Memorandum on the Dehra Ghazee Khan District*.

68. *Dera Ghazi Khan District Gazetteer, 1883–84* (Lahore: Arya Press, 1884), 28.

69. Minchin, *Memorandum on the Beloch Tribes*.

70. Mussoo Khan was the leader of a relatively small tribe settled largely on the plains in Sangarh tahsil, but he was a man who had “influential connections both within and beyond the border” and who possessed both capital and ambition. Bruce, *Notes on the Dera Ghazee Khan District*, 116. Although his efforts enhanced his local power, they also precipitated considerable conflict. Existing proprietors of wells were initially promised adhlapi rights, or half-shares on village wastes newly opened to cultivation; nevertheless, many objected to Mussoo Khan’s claims to “waste” in an area of considerable periodic cultivation. He also faced strong opposition from some prominent local Sayyids. For details, see Punjab Revenue, 9 July 1864, nos. 28–30 (including printed abstract of “Correspondence Regarding the Excavation of a Canal by Mussoo Khan”).

71. Minchin, Offg. DC, DKG to Comm. & Super., Derajat, 16 November 1861, Punjab BOR, file 251/106.

72. J. B. Lyall, Settlement Comm., Multan and Derajat Divisions to Settlement Sec. to Fin. Comm., Punjab, 31 July 1875, Punjab BOR, file 251/106.

73. Both the Lund and the Khosa canals appear to have made use of the route of the old Haibatwah canal, dug originally during the Mirrani period, that had long since fallen into disuse. But the conflicts their efforts engendered are discussed below.

74. Conflict with the Marris had forced the Legharis to give up the cultivation of most of their lands in Barkhan by the time the British arrived, though they later tried to reclaim these lands through the courts (see note 126 below).

75. Griffin and Massy, *Chiefs and Families of Note*, II: 341–45; Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District*, 50; Punjab Revenue & Agric. (Land Rev) February 1904, part B, no. 8 (“Allowances and Privileges of Leghari Tumandar”), NAI. The shrine at Sakhi Sarwar attracted pilgrims among Muslims, Hindus, and Sikhs alike; it held special significance for the Sikhs, as it was an important site of pilgrimage for Sikhs from across the Punjab. For a discussion of Sakhi Sarwar and the shrine, see Harjot Oberoi, *The Construction of Religious Boundaries: Culture, Identity and Diversity in the Sikh Tradition* (Chicago: University of Chicago Press, 1994), 147–60.

76. Minchin, *Memorandum on the Beloch Tribes*, 17–18. Though long ruled by a collateral branch (Rahim Khan), in the early years of British rule Jamal Khan Leghari and his uncle, Jalal Khan, were engaged in a struggle over the tumandarship of the tribe. Jalal Khan’s claims rested in part on his marriage into the Rahim Khan branch.

77. This included reorienting irrigation near the head of the Manka to ensure that adequate water reached the tail. To do this, the British severed several branch canals previously

attached to the Manka near its head, and they excavated new cuts for these branches from the river. But this created serious problems and spurred resentment against both Jamal Khan and the British among other Baloch chiefs whose own irrigation concerns were affected. The greatest problem was with the Khosas. Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District*, 57. (For further discussion of this, see the chapter text below.)

78. The exact terms of the agreement and excavation are not totally clear. For discussion, see Foreign, #41, August 1875, IOL.

79. J. B. Lyall, Settlement Comm., Multan and Derajat Divisions to Settlement Sec. To Fin. Comm., Punjab, 31 July 1875, Punjab BOR, file 251/106.

80. According to Lyall, Jamal Khan and his “outsider confederates” probably timed the submission of their petition to try to forestall the Rajanpur zamindars. J. B. Lyall, Settlement Comm., Multan and Derajat Divisions to Settlement Sec. To Fin. Comm., Punjab, 31 July 1875, Punjab BOR, file 251/106. The Serai family of Rajanpur were not Baloch but descendants of the Kalhoras. Griffin and Massy, *Chiefs and Families of Note*, II: 346–51.

81. It is important to remember that this occurred during a period, in the 1860s, when the British had briefly encouraged the development of irrigation through irrigation “companies” in India more broadly. See Elizabeth Whitcombe, “Irrigation,” in *The Cambridge Economic History of India*, vol. II, ed. Dharma Kumar (Cambridge, Engl.: Cambridge University Press, 1982), 693–94. That the British themselves saw working through the chiefs as a way of tapping local capital for canal investment was suggested by the comments of the Punjab financial commissioner, who noted that, though the “native capitalists” would not readily loan to the government to build canals, “the zamindars, or at all events, the chiefs could secure loans [for canal investment] at the usual market rate.” Fin. Comm., Punjab to Sec to Govt, Punjab, 5 March 1864, Punjab Revenue, 9 July 1864, nos. 28–30, Punjab Archives, Lahore.

82. See Minchin, Offg. DC, DGK to Comm. & Super., Derajat, 16 November 1861, Punjab BOR, file 251/106, pp. 14–15.

83. Some of the conflicts are discussed by Lyall in a long note: J. B. Lyall, Settlement Comm., Multan and Derajat Divisions to Settlement Sec. To Fin. Comm., Punjab, 31 July 1875, Punjab BOR, file 251/106. He details in particular the conflicts on the Pharrria, a silted-up branch canal, which the “Company” sought to annex to their project, reexcavating the canal and investing in indigo vats. But the existing zamindars resisted bitterly.

84. Comm. & Super., Derajat Division to Fin. Comm., Punjab, 20 July 1865, Punjab Public Works, Irrigation, September 1865, no. 15, IOL.

85. DC, DGK to Ex Eng, Indus Canals, 17 December 1864, Punjab Public Works, Oct. 1865, Civil works, Agric, #5, IOL.

86. Minchin, *Memorandum on the Beloch Tribes*, 38.

87. *Ibid.*, 37.

88. For a statement of this basic argument, see Brian Spooner, “Insiders and Outsiders in Baluchistan: Western and Indigenous Perspectives on Ecology and Development,” in *Lands at Risk in the Third World: Local Level Perspectives*, ed. Peter D. Little and Michael M. Horowitz with Endre Nyerges (Boulder, Colo.: Westview, 1987).

89. Bruce, *Notes on the Dera Ghazee Khan District*, 120.

90. The relationship between “waste” and productive agriculture in British thinking is developed much further in chapter 3.

91. At times this was recognized by the British themselves. In spite of the more usual, undifferentiated British use of the term, one British official drew a distinction between “jangal” and “sher ka jangal” where, in spite of some attempts at grazing, a tract was “so dense and large” that bands of hill robbers “elude in its mazes the most persevering search for them carried out by large bodies of the neighboring Biloches.” “Memorandum on the Remunerative Merits of the Gyamul Branch of the Kadra Canal,” attached to DC, DGK to Sec. To Govt., Punjab, Public Works, 22 July 1864, Punjab Public Works, Oct. 1865, Civil Works, Agric., #5, IOL. See also Michael R. Dove, “The Dialectical History of ‘Jungle’ in Pakistan: An Examination of the Relationship between Nature and Culture,” *Journal of Anthropological Research* 48 (1992): 231–53.

92. Richard Isaac Bruce, *The Forward Policy* (London: Longmans Green, 1900), 14–15.

93. This is why the differences between Sind and Punjab frontier control policies were of such concern to Sandeman. These differences are discussed in Minchin, *Memorandum on the Beloch Tribes*, 35–37.

94. T.H. Thornton, *Colonel Sir Robert Sandeman: His Life and Work on Our Indian Frontier* (1895; repr., Karachi: Oxford University Press, 1979), 36. The mythology surrounding Sandeman in British administrative lore is thick. Thornton opines that Sandeman’s recent loss of his wife and children to diphtheria had perhaps prepared him for his bold and reckless undertaking. See also the assessment by Sir Ronald Wingate in his introduction to the 1979 reprint of Thornton’s book: Sandeman succeeded in the late 1860s, Wingate writes, “without military assistance, but simply by force of his personality, by an almost reckless disregard for danger, in three years in bringing order to the [DGK] district” (*ibid.*, x).

95. A critical part of the Sandeman myth rested on British assumptions about the effect that Sandeman’s actions had on the Baloch. Recording a Balochi poem by a Drishak bard, Dames noted that “The event was a new development in Baloch history, a successful attempt by a ruler of the plains to manage the hill-tribes by peaceful methods.” Dames, *Popular Poetry*, 100.

96. The long-term career of Sandeman’s “forward policy” hinged on a debate with British officers in Sind over whether the khan of Kalat, the most powerful chief in Baluchistan, was to be viewed as a centralized ruler or simply as the head of a large tribal confederacy. This issue, of course, had critical implications for whether the boundaries between the British and Baluchistan were viewed as fixed or highly permeable. Although Sandeman came to be the arbiter of policy in Dera Ghazi Khan in the late 1860s, his ideas were at first rejected by the government of India in favor of those of the Sind administration. By the mid-1870s, however, Sandeman had triumphed, and in 1877, when the Baluchistan Agency was created, Sandeman became the first agent to the governor-general for Baluchistan. For a broader discussion of the Sandeman policy, see Magnus Marsden and Benjamin D. Hopkins, *Fragments of the Afghan Frontier* (New York: Columbia University Press, 2011), 49–74.

97. For discussions of contracting canal clearances in Sind in this era, see Bombay Public Works Dept., Irrigation, no. 125 of 1871, vol. 753 of 1868–1890, and Bombay Public Works Dept., Irrigation, no. 70 of 1892, vol. 283 of 1890–98, Maharashtra State Archives, Bombay.

98. In this, the British followed the policy of Diwan Sawan Mal, who had decided to clear the Dera Ghazi Khan canals with paid labor, rather than with *chhers*, and who had established the policy of the state paying half the cost and the irrigators paying the other half.

99. Punjab Public Works, Civil Works–Irrigation, February 1869, proc. #1, IOL.
100. Sandeman to Commissioner, Derajat, 16 June 1868, Punjab Public Works, Civil Works–Irrigation, July 1869, #1, IOL.
101. DC, DGK, to Sec. To Govt., Punjab, Public Works, 22 July 1864, Punjab Public Works, Oct. 1865, Civil Works, Agric., #5, IOL.
102. Foreign Dept. Procs. (Pol A), June 1863, nos. 123–125 (Settlement of sections of the Boogtee in the DGK Plains), NAI.
103. Bruce implies that this was because profits from cattle (both their own and stolen) were potentially greater for the Bugtis than profits from agriculture. “Without skilled labor and the expenditure of money in erecting bunds and cutting watercourses to bring them into culturable order,” he wrote, the returns were limited and not sufficient to attract Baloch labor. J.R. Bruce, Asst. Comm., Rajanpur to DC, DGK, 16 Dec. 1867, Punjab Foreign Procs, January 1874, no. 12, IOL.
104. Punjab Public Works, Civil Works–Irrigation, #20, March 1868, IOL.
105. Undersec. To Govt, Punjab, PWD, Irrigation Branch to Sec. To Govt., Punjab, 17 March 1868, Punjab Public Works, Civil Works–Irrigation, #11, March 1868, IOL.
106. Kirwan defended himself by noting that one contract given to the chief of the Drishak tribe, local allies of the Mazaris, had resulted in inadequate clearance. Further, he noted, “the man who takes the contract does not take the labor of his own tribe to clear the canal, but employs the people of the country through which the canal runs.” But this hardly answered the larger political objections. The lieutenant-governor ultimately urged the executive engineer in the future to gain the deputy commissioner’s concurrence before giving any clearance contract “for a canal belonging to one tribe to an individual belonging to another.” Punjab Public Works, Civil Works–Irrigation, #3, March 1869, IOL.
107. Memo by DC, DGK on the Khosa Tribe and Their Branch Canal Called the Dho-ree, Punjab Public Works, Civil Works–Irrigation, #18, March 1868, IOL.
108. Foreign Department Proceedings, political A, June 1868, #82–86 (Arrangements made with Khetran, Boogtee, and Murree since the Hurrund Raid of 1867), NAI.
109. Punjab Public Works, Civil Works–Irrigation, July 1869, #1, IOL.
110. Bruce, *Forward Policy*, 16.
111. Thornton, *Colonel Sir Robert Sandeman*, 32. Most of the account of the Hurrund raid is taken from Bruce, *Forward Policy*, 24–32. For an account of Ghulam Husain Bugti, see also Kamran Azam, *Bugṭi Qabilah: Tarikh va Tahzib ke Tanazur men* (Lahore: Taqleeqat, 2006), 102–4.
112. Punjab Judicial, August 1870, #13, IOL.
113. Punjab Judicial, February 1871, #15, IOL. Much of this occurred during the period of the American Civil War, when cotton speculations at Bombay could be extremely profitable.
114. J. B. B. Boyle, Barr-at-law, to Govt Advocate, Punjab, 25 August 1870, Punjab Judicial, October 1870, #29, IOL.
115. The concern to incorporate Baloch ethnicity within a framework of British administration involved using tribal levies to protect the frontier, but it existed nowhere more fully than in British approaches to the law, most notably with the development of the tribal *jirga*, or assembly of leaders. For a discussion and critique of Sandeman’s *jirga* policy, see Marsden and Hopkins, *Fragments of the Afghan Frontier*, 69–72.

116. R. J. Bruce, Officiating DC, DGK to Officiating Comm. & Super., Derajat, 10 Sept. 1872, Punjab Foreign, #12, January 1874, IOL. In discussing settlement of the Bugti, Munro, the Derajat commissioner, had in 1872 complained that the attempt to settle groups of Bugtis in Dera Ghazi Khan had failed not only because of inadequate water supplies on their lands but also because the Bugtis never appreciated the offer of lands for settlement, preferring plundering, and “were not disposed to settle down to labor on the plains, forsaking their former haunts and abandoning the marauding habits inherited from their ancestors.” To this, Bruce replied that the problem was not indisposition to agriculture but the separation of settled sections from the Baloch as a whole.

117. Thornton, *Colonel Sir Robert Sandeman*, 30.

118. Griffin and Massy, *Chiefs and Families of Note*, II: 343.

119. “Elegy on the Death of Nawab Jamal Khan,” in Dames, *Popular Poetry*, 105–10. On Jamal Khan’s death while returning from hajj, “an assembly of Chiefs,” as Dames put it, “offered a prize for the best elegy and this was won by Panju Bangulani (a member of the Lashari clan of the Gurchanis).” All quotations in this paragraph are from this poem.

120. Interestingly, in terms of irrigation works, the poet made direct reference only to Jamal Khan’s construction of a karez (or underground water channel), rather than to his far more significant role in constructing inundation canals. This was probably because karez, which were common in Baluchistan but rare in Dera Ghazi Khan, had stronger hill-Baloch cultural connotations. Jamal Khan had built one important karez, at Choti Bala, modeled on works in Quetta district. See Griffin and Massy, *Chiefs and Families of Note*, II: 343.

121. Punjab Judicial, August 1870, #13, IOL.

122. Punjab Foreign, January 1874, no. 7, IOL.

123. In the Dera Ghazi Khan tahsil, e.g. (where the Legharis were the largest landowners), non-Baloch owned more than half of the canal-irrigated acreage by the time of the second settlement in the 1890s (though Baloch still owned 85 percent of the cultivation in the more uncertain rodkohi-irrigated pachad). Increasingly large amounts of land in canal-irrigated tracts were owned by Jats and Hindus, which reflected the existence of a significant (and expanding) land market in the 1870s and 1880s, particularly for lands protected by both wells and canals, on which the “better class” of commercial crops, cotton and wheat, were increasingly being grown. A. H. Diack, *Assessment Report of the Dera Ghazi Khan Tahsil, 1896* (Lahore: Civil and Military Gazette Press, 1898), 45, 57.

124. As a principle, this had been asserted as early as 1866. Maj. W. G. Davies, Offg. Comm. of Settlement, Multan & Derajat to Fin Comm., 27 November 1874, Punjab Foreign, August 1875, no. 41, IOL. See also Punjab BOR, file 251/106 (Purchase of the Nur and Dhundi Canals); Punjab Foreign, June 1878, no. 4; and Punjab Foreign, November 1878, no. 20 (Purchase of Dhori and Fazalwah Canals), IOL.

125. Here there are parallels with the dynamics attending the conversion of “little kings” into landlords on a broader scale in India. See, e.g., T. R. Metcalf, “From Raja to Landlord: the Oudh Taluqdars, 1850–1870,” in *Land Control and Social Structure in Indian History*, ed. Robert Frykenberg (Madison: University of Wisconsin Press, 1969), 123–41.

126. Jamal Khan’s descendants waged a long legal battle, for example, to establish the title of the Leghari tumandars to lands in the Barkhan valley that the Legharis had lost in military conflict with the Marris just before the establishment of British rule.

127. Note by DC, DGK (A. V. Askwith) to Sr. Sec. to Fin. Comm, 12 December 1927, and Application of Jamal Khan Leghari for release of his estate, 25 May 1932, Punjab BOR, file 601/1/29/71 (Management of the Estate of K. B. Nawab Jamal Khan, Leghari Tumandar).

128. The total of 114,000 acres, given by Jamal Khan himself at that time, is approximate. Of this land, about 96,000 acres were listed as “uncultivated.” Approximately 12,000 acres were returned as canal-irrigated land and 2,500 acres as irrigated by rodkahi (though figures for this form of production were, of course, quite variable [see next note]). The estate also claimed *ala milkiyat* (rights of superior proprietorship) on lands in the Barkhan valley, fifteen squares (375 acres) of canal colony lands in Multan district (awarded as a “landed gentry” grant in the 1910s), and an indeterminate amount of unmeasured land in the Dera Ghazi Khan tribal areas. Attachment to A. V. Askwith, DC, DGK to Commissioner, Multan, 23 February 1928, Punjab BOR, file 601/1/29/71 (Management of the Estate of K. B. Nawab Jamal Khan, Leghari Tumandar).

129. An indication of the variations in year-to-year crop output from rodkahi areas, as compared with canal-irrigated areas, is provided in the assessment reports for Dera Ghazi Khan tahsil. The acreage harvested in the pachad varied hugely from 26,000 acres to 91,000 acres per annum between 1890 and 1895. The corresponding variation in this period in the *chahi-nahri* (or canal and well-irrigated) area was from 120,000 acres to 136,000 acres. Diack, *Assessment Report of the Dera Ghazi Khan Tahsil*, 6. Although inundation canal production varied (and on some canals considerably), the variability of torrent irrigation was of another order. (For a discussion of variability in cultivated area on individual canals, see Punjab, Rev & Ag. Irrigation, December 1895, appendix nos. 19–30, IOL.)

130. Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District*, 133.

131. For a discussion of these tumandari inams and of the jagir batai system, see *ibid.*, 150–54. As J. B. Lyall noted in his review at the beginning of Fryer’s settlement report, the right of tumandars to collect the revenue from their tribesmen on the tumans probably only dated back to the period immediately before the British, sometimes then only in areas near the seat of the chief (*ibid.*, 9). But these were now treated as historical tribal rights. Recognition of these inams was now also linked to other tumandari obligations, including the supply of *sowars* (horsemen) to the government, up to a fixed amount (calculated at the rate of four annas per sowar per day). The largest levy (Rs. 2,000) was required from the Leghari and Mazari tumandars, who also had the largest inams. See also P. J. Fagan, “Confidential Note dated 25th April 1920, recorded by the Financial Commissioner, Punjab, on the jagir batai system, in force in certain tumans of the Dera Ghazi Khan District,” Punjab BOR.

CHAPTER 3. COMMUNITY ON THE WASTE

1. Quoted in K. V. Mital, *History of the Thomason College of Engineering, 1847–1949* (Roorkee: University of Roorkee, 1986), 44–45.

2. C. L. Tupper, *Punjab Customary Law* (Calcutta: Government Printing, 1881), I: 17.

3. Alfred Deakin, *Irrigated India: An Australian View of India and Ceylon, Their Irrigation and Agriculture* (London: W. Thacker and Co., 1893), 110, 197–98.

4. Originally, the canal was built using temporary dams placed in the Ravi river near the head of the old Hasli at Madhopur, but after these were repeatedly swept away, they were

replaced in the 1870s by a masonry weir across the Ravi. Note on the Bari Doab Canal by H. F. B. Frost, Superintending Engineer, Bari Doab Circle, Punjab PWD, Irrigation, #355 of 1904 (“History and Description of Government Canals in the Punjab and NWFP”), pp. 8–9, Punjab Public Works Secretariat, Lahore.

5. Ranajit Guha, *A Rule of Property for Bengal* (Paris: Mouton, 1963). The close connections between economic theorizing in Britain and discussions of property law in India have been traced also by Eric Stokes, *The English Utilitarians and India* (Oxford: Clarendon Press, 1959), and Ravinder Kumar, *Western India in the Nineteenth Century: A Study in the Social History of Maharashtra* (London: Routledge and Kegan Paul, 1968).

6. The best discussion of this is Clive Dewey, *The Settlement Literature of the Greater Punjab: A Handbook* (Delhi: Manohar, 1991).

7. There is a huge literature on the “village” and its meanings in colonial India (and after). For a discussion of colonial “essentialist” ideas about the village (and the “village community”), see Ronald Inden, *Imagining India* (Oxford: Basil Blackwell, 1990), 131–61. For an overview of the role of the “village community” in political debate—and suggesting the connections between the views of Sir Henry Sumner Maine and Gandhi—see Karuna Mantena, “Gandhi’s Critique of the State: Sources, Contexts, Conjunctures,” *Modern Intellectual History* 9, no. 3 (2012): 535–63.

8. B. H. Baden-Powell, *The Land-Systems of British India* (Oxford: Clarendon Press, 1892), I: 217–18, 234.

9. J. M. Douie, *Punjab Settlement Manual* (1899; repr., Delhi: Daya Publishing House, 1985), 61.

10. Sir Richard Temple, “Social Science in the British Empire Abroad,” in *Oriental Experience* (1883; repr., Delhi: Gian Publishing House, 1986), 478–79.

11. Baden-Powell, *Land-Systems of British India*, I: 217–18.

12. Dewey, *Settlement Literature*, 25.

13. Leslie S. Saunders, *Report on the Revised Land Revenue Settlement of the Lahore District in the Lahore Division* (Lahore: Central Jail Press, 1873), 75.

14. James Scott, “State Simplifications: Nature, Space and People,” *Journal of Political Philosophy* 3, no. 3 (1995): 231.

15. For a discussion of a specific case of this pattern, see Tom G. Kessinger, *Vilyatpur, 1848–1968: Social and Economic Change in a North Indian Village* (Berkeley: University of California Press, 1974).

16. Richard Saumarez Smith provides a good overview of the importance of cadastral mapping in Punjab but also of some of its nuances and limitations; see his “Mapping Landed Property: A Necessary Technology of Imperial Rule?” in *Constituting Modernity: Private Property in the East and West*, ed. Huri Islamoglu (London: I. B. Tauris, 2004), 149–79.

17. Roger J. P. Kain and Elizabeth Baigent, *The Cadastral Map in the Service of the State* (Chicago: University of Chicago Press, 1992), 328. By the time the British had moved into central Punjab in the 1830s and 1840s, the great trigonometrical survey of India, begun in the south in 1802, was already well advanced. The revenue mapping of fields and villages in particular districts was generally not integrated with this survey, but the process of mapping each district and village was nevertheless central to the establishment of a rational, ordered frame in which the distribution of property rights was carried out. For a discussion of

India's mapping, see Matthew H. Edney, *Mapping an Empire: The Geographical Construction of British India, 1765–1843* (Chicago: University of Chicago Press, 1997).

18. See Richard Saumarez Smith, *Rule by Records: Land Registration and Village Custom in Early British Panjab* (Delhi: Oxford University Press, 1996), 18–48. As Charles Roe and H. A. B. Rattigan later wrote in explicating this system for use by the courts, it is “the feeling of kinship, and not the mere common interest in the land” that ultimately “regulates” the village community's customs; see their *Tribal Law in the Punjab, So Far as It Relates to Right in Ancestral Land* (Lahore: Civil and Military Gazette Press, 1895), 8. Of course, this did not exclude the possibility that village “proprietors” took land on rent from other proprietors as well and thus could technically also be “tenants.”

19. Smith, *Rule by Records*, 159.

20. Differences in the nature of ancestral shares were also central to British revenue writing. The most important distinction was that between *pattidari* villages, where shares were theoretically based on the laws of inheritance descending from an individual founder, and the *bhaiachara* village, where shares were theoretically calculated based on the customary division of a founding brotherhood. See Minoti Chakravarty-Kaul, *Common Lands and Customary Law: Institutional Change in North India over the Past Two Centuries* (Delhi: Oxford University Press, 1996), 77–80.

21. As Perry Anderson reminds us, official recording of private property rights represented in Europe a critical mechanism by which absolutist monarchies in Europe negotiated alliances with local elites and landholding nobilities in order to define the foundations of state power. See Perry Anderson, *Lineages of the Absolutist State* (London: Verso, 1979), 429. Smallholders also played critical roles in this process, since alliance with the state in the mapping of property rights at times offered potential protection against the exactions of local lords, even as, at other times, it threatened their claims to autonomy, livelihood, or local influence.

22. For a brief discussion of Tonnies's “idealised dichotomy,” articulated in the 1880s, see Studdert, *Conceptualising Community*, 21–25. Studdert emphasizes the centrality of “original kinship and inherited status” to Tonnies's conceptualization of *gemeinschaft* (a form of community defined by “the natural[,] organic, affective”) as contrasted to the commercial foundations of *gesellschaft* (a form of community defined by “the artificial, purposive, instrumental”). Though a “simplistic dichotomy,” in Studdert's view, it was one with a deep-seated, long-term influence on sociology's engagement with the concept of “community.”

23. This view was predicated on the notion that, in India, communities were far closer to their status-based roots than in the “West.” As Maine wrote, “In Western Europe, if a natural group breaks up, its members can only form a new one by voluntary agreement. In Central India they would recombine on the footing and on the model of a natural family.” Maine, *Village-Communities in the East and West*, 220.

24. Tupper, *Punjab Customary Law*, I: 17. Although Tupper cast British policy in the language of paternalism, a conception of two competing forms of community clearly marked his thinking: “In mature societies, the individual may stand alone, or choose his sphere of co-operation with others by an act of deliberate judgment; but in primitive countries, such as the Punjab still is, the cement of kinship may be as necessary to social well-being, and even to healthy social advance, as the authority of the parent is everywhere to the nurture of the child” (I: 47).

25. The quote is from “Note by Sir William Rattigan,” Dec. 26, 1897, printed in *Report on the Punjab Codification of Customary Law Conference (September 1915)* (Lahore: Government Printing, 1915), 36. For a full discussion of Maine’s ideas, see Mantena, *Alibis of Empire*.

26. As Roe and Rattigan noted, “The information given was very meagre, and it was repeated *verbatim* for village after village, so that it was impossible to say how far it represented the opinions of the people themselves, or was a mere invention of the officials drawing up the record.” Nevertheless, such entries still often played a role in litigation. Roe and Rattigan, *Tribal Law in the Punjab*, 33.

27. A detailed history of the administrative background to the development of these questionnaires is in Tupper, *Punjab Customary Law*, see vol. I in particular. As many officials themselves admitted, answers to questions on customary law questionnaires tended to be homogenized by the very form of the questionnaires, and, even for particular “tribes,” the recorded “customs” were often not those of the “tribe” as a whole (if such actually existed) but those of the most powerful and well connected.

28. Smith, *Rule by Records*, 64–66, 74–77. Important Tenancy Acts for the Punjab were passed in 1868 and 1877, and several times amended.

29. Tupper, *Punjab Customary Law*, II: 62 (emphasis added).

30. Smith, *Rule by Records*, 64–66.

31. As one twentieth-century settlement officer wrote, the answers given by the “tribes” to these questionnaires were frequently influenced by “the convenience of their influential members.” Mohammad Hayat Khan Noon, *Customary Law of the Pakpattan and Divalpur Tahsils of the Montgomery District* (Lahore: Government Printing, 1925), 1.

32. Roe and Rattigan, *Tribal Law in the Punjab*, 19.

33. Tupper, *Punjab Customary Law*, II: 70–77. Here Tupper’s arguments built on but departed somewhat from those of Maine. In his own theorizing, Maine had argued that patriarchy lay at the very root of primitive community, since all community had evolved from the patriarchal family. See Adam Kuper, “The Rise and Fall of Maine’s Patriarchal Society,” in *The Victorian Achievement of Sir Henry Maine*, ed. Alan Diamond (Cambridge, Engl.: Cambridge University Press, 1991). Tupper saw the tribe rather than the family as the evolutionary starting point for patriarchal authority.

34. Tupper explicitly underscored the importance of a “theory” of custom as necessary for any effective adaptation of custom for use in the courts. Tupper, *Punjab Customary Law*, II: 77.

35. For a brief overview, see Ajay Kumar, “Khap Panchayats: A Socio-Historical Overview,” *Economic and Political Weekly* 47, no. 4 (Jan. 28, 2012): 59–64.

36. Hamza A. Alavi, “Kinship in West Punjab Villages,” *Contributions to Indian Sociology*, new series, 6 (Dec. 1972): 2.

37. Hamza A. Alavi, “The Politics of Dependence: A Village in West Punjab,” *South Asian Review* 4, no. 2 (Jan. 1971): 116–17.

38. It was a system, as Prem Chowdhry notes, in which hierarchy and equality were in complex balance. Prem Chowdhry, “Caste Panchayats and the Policing of Marriage in Haryana: Enforcing Kinship and Territorial Exogamy,” *Contributions to Indian Sociology* 38, nos. 1–2 (2004): 1.

39. For further speculations on the reasons for this, see David Gilmartin, *Civilization and Modernity: Narrating the Creation of Pakistan* (Delhi: Yoda Press, 2014), 25–55. Farina

Mir emphasizes the far greater importance in Punjabi literature of this era of the term *zat*. See Farina Mir, *The Social Space of Language: Vernacular Culture in British Colonial Punjab* (Berkeley: University of California Press, 2010).

40. Douglas Merrey suggests that, as distinctive institutions, biradaris may have emerged in western Punjab out of the processes of semi-nomadic settlement. Self-conscious biradaris, he argues, grew out of the fluid idioms of nomadic, patrilineal kinship as the British awarded rights in land to individuals while still recognizing the residual rights of agnatic kin. Douglas James Merrey, "Irrigation, Poverty and Social Change in a Village of Pakistani Punjab: An Historical and Cultural Ecological Analysis" (Ph.D. diss., University of Pennsylvania, 1983), 559.

41. Baden-Powell, *Land-Systems of British India*, I: 234–35. As David Ludden notes, this pattern had become clear at least by the time of Munro's *ryotwari* (cultivator-based) settlement in south India, which laid clear legal ground for the "radical division of property rights into distinct public and private domains." David Ludden, *Peasant History in South India* (Princeton: Princeton University Press, 1985), 170–71.

42. Garrett Hardin, "The Tragedy of the Commons," *Science*, no. 162 (Dec. 1968): 1243–48.

43. For a good overview and critique of the varied approaches in academic and developmental writing on the "commons," see Michael Goldman, "'Customs in Common': The Epistemic World of the Commons Scholars," *Theory and Society* 26, no. 1 (Feb. 1997): 1–37. For an important study of the history of the commons in the Punjab, see Chakravarty-Kaul, *Common Lands and Customary Law*.

44. Smith, *Rule by Records*, 32.

45. As Chakravarty-Kaul puts it, "The *shamilat* was apparently that waste which had not been appropriated by individual families descended from original settlers and had been kept in common for grazing 'so long as it was not appropriated for cultivation.'" Chakravarty-Kaul, *Common Lands and Customary Law*, 79–80.

46. See, e.g., Capt. Hector Mackenzie, *Report of the Revised Settlement of the Goojerat District in the Rawulpindee Division* (Lahore: Hope Press, 1861), 117. This also produced considerable tension in Sind, though revenue settlements there took a different form. In Sind, it was far more common that waste was included in individual holdings. Given Sind's extreme aridity, individuals were allowed to lay claim to large proprietary parcels on the expectation that they would cultivate only a small part in any given year due to the constraints of water.

47. See J. Mark Baker, "Colonial Influences on Property, Community, and Land Use in Kangra, Himachal Pradesh," in *Agrarian Environments: Resources, Representation, and Rule in India*, ed. Arun Agrawal and K. Sivaramkrishnan (Durham, N.C.: Duke University Press, 2000).

48. Baden-Powell, *Land-Systems of British India*, III: 545–46.

49. For some discussion of this, see Dove, "Dialectical History of 'Jungle' in Pakistan."

50. Chakravarty-Kaul, *Common Lands and Customary Law*, 80–92.

51. Although lawsuits could sometimes prevent unauthorized cultivation on the commons, or enforce rights laid out in the *wajib-ul-arz*, the law offered no standing to the village community to administer the commons in a corporate fashion. This is not to imply that villages did not sometimes effectively administer common lands in spite of this. But the

basic legal situation was a product of the underlying structure of British law. The problems this engendered were sometimes noticed by British officials, often a bit disingenuously. As James Wilson wrote in the 1890s, “A short act providing that common lands may be managed under rules drawn up with the consent of three-fourths of the recorded owners and of the residents in the village and with the sanction of the collector would lead to a diminution of partitions and be an immense boon to the agricultural community.” James Wilson, DC Shahpur, to S. S. Thorburn, Comm. & Super., Rawalpindi, 24 April 1896, Punjab Board of Revenue, file #171/36 (Partition of shamilat lands of Mauza Mangowal Khurd, Shahpur). Such legislation, however, never occurred.

52. Douie, *Punjab Settlement Manual*, 61. See also J. M. Douie, *Punjab Land Administration Manual* (Chandigarh: Controller, Printing and Stationery, 1972), 263. In some districts, common lands for the whole village were divided, and in many villages only the commons belonging to particular genealogical segments (tarafs) remained. See Edward A. Prinsep, *Report of the Settlement of the Sealkote District, 1855–60* (Lahore: Punjab Government, 1865), 104.

53. For a discussion of partitions, see Chakravarty-Kaul, *Common Lands and Customary Law*, 121–37, 256–59. The common reliance, within the framework of customary law, on partition as the key legal instrument of proprietary control over the commons was suggested by the holding of the courts that the proprietary body could not oust a co-sharer who cultivated his portion of the commons except by partition (unless the encroachment was of the sort that would prejudice partition as a remedy). There were, however, some conflicting judgments relating to the circumstances in which an encroacher could be ousted. Kai-khosru J. Rustomji, *A Treatise on Customary Law in the Punjab* (Lahore: University Book Agency, 1929), 654–57. The history of partitions, of course, like all else having to do with villages, was variable and complex.

54. It is important to note that, though these competing inscriptions of community on the land took particular form in the colonial Indus basin context, they represent a variant on a critical form of modern environmental statecraft more broadly. A good example is provided by the modern practice of setting aside “national parks” (in the United States, for example) as explicitly nonproductive spaces—or in some cases “wilderness” spaces—precisely to reflect a vision of community (in this case, *national* community) imagined as shaped by nature’s autonomous action upon man, rather than the reverse. This is a form of community that operates outside the realm of political economy, and in an antithetical relationship to it, even if it is one, in practice, often caught up in the larger imperatives of property systems defined fundamentally by work and action upon nature. What marked such processes out as distinct in the colonial setting, of course, was that they were associated not with a “national community” but with the assumed primacy of the local, genealogical, or “tribal” community as the stabilizing key to the social order, a frame of local order held in juxtaposition to the world of self-interested production by the overarching authority of the colonial state. Yet the interrelationship of such countervailing visions of community in environmental politics more broadly has been much debated in the environmental literature, if not always in the clearest ways. See, e.g., the debates among environmentalists unleashed by William Cronon, “The Trouble with Wilderness; or, Getting Back to the Wrong Nature,” in *Uncommon Ground: Rethinking the Human Place in Nature*, ed. William Cronon (New York: Norton, 1995), 69–90.

55. Reply of the Board of Administration to report on the Khangarh settlement, September 5, 1849, Punjab Revenue, 13 October 1849, #4–6, Punjab Archives, Lahore.

56. Roe, *Report on the Revised Settlement of the Multan District*, 39–40. See also E. B. Steedman, *Report on the Revised Settlement of the Jhang District, 1874–1880* (Lahore: W. Ball, 1882), 55.

57. The language here is from the Haveli Bahadur Shah case discussed in the chapter text below. Civil Judgements, Chief Court of Punjab, 1868, #64, Kaem Shah and others, Plaintiffs vs. Mohumda and others, Defendants, *Punjab Record*, 1868, pp. 159–166. See also Steedman, *Report on the Revised Settlement of the Jhang District*, 70.

58. Douie, *Punjab Settlement Manual*, 73. There were, of course, considerable complexities to these patterns, but Douie's language underscores the distinctive legal meaning here of "common waste" for the British. It is his point *not* that those settled on wells did not make common use of the wasteland scattered among their wells, but that "common waste" in a legal sense could not exist. For a discussion, see James B. Lyall, "Note on the Nature and Origin of Proprietary Right in the Mooltan Division," Punjab Revenue & Agriculture, Revenue, August 1877, #12, Punjab Archives, Lahore.

59. Capt. Hector Mackenzie, *Report on the Revision of the Settlement of the Land Tax and Tirnee Revenue in the Cis Indus Portion of the Dera Ismail Khan District, Comprising the Leia and Bukker Tehseels* (Lahore: Hope Press, 1865), 4. For a discussion of the operation of wells in the Thal, see also B. D. Talib and B. K. Goswami, *Economics of Well Irrigation of the Thal* (Lahore: Punjab Board of Economic Enquiry, 1950), 35–39. As Lyall wrote of the Multan bar, "In years of more than usually scanty rainfall, when there is no grass in the bar, the proprietors go off with their cattle; if they stay the cattle starve or eat up the crops." J. B. Lyall, Settlement Comm., Multan & Derajat to Settlement Sec., 24 July 1876, Punjab, Rev. & Agric., Revenue, July 1887, #1, IOL.

60. Steedman, *Report on the Revised Settlement of the Jhang District*, 106.

61. J. B. Lyall, Settlement Comm., Multan & Derajat to Settlement Sec., 24 July 1876, Punjab, Rev. & Agric., Revenue, July 1887, #1, IOL.

62. James B. Lyall, "Note on the Nature and Origin of Proprietary Right in the Mooltan Division," Punjab, Revenue & Agriculture, Revenue, August 1877, #12, Punjab Archives, Lahore.

63. See, e.g., "Patta Granted by Diwan Chand (a Kardar of the Nawab of Bahawalpur), A.D. 1816," *Multan District Gazetteer, 1901–02*, appendix, pp. 385–86.

64. Diwan Sawan Mal's agrarian policies had been closely related to the patrimonial structure of his regime and to his concern to enhance state revenue by linking agricultural production to his attempts to engross regional trade in Multan. His attempts to channel capital onto the land (for the encouragement of cash crops, such as indigo, that were traded through Multan) and his manipulation of lineage and of local religious influence to organize his relations with both traders and potentially dangerous pastoralists reflected this imperative. "It is said," the first settlement officer of Leiah wrote in 1849, "that Sawun Mall and Moolraj made all their enormous wealth by being the brokers of it [the central Asian trade with Hindostan] and protecting the Kafilas from the Indus to the Sutledge; it can therefore be easily understood why Mooltan became the place of rendezvous." Capt. J. E. Hollings, Deputy Comm., Leiah to G. J. Christian, Sec. to Bd. of Administration, Lahore, 21 May 1849, Punjab Revenue, 26 May 1849, #235–36, Punjab Archives, Lahore.

65. Roe, *Report of the Revised Settlement of the Multan District*, 41.
66. *Ibid.*, 10.
67. Generally, as one official noted, “a lease of 50 acres is given to any cultivator who sinks an ordinary well, and a lease of 100 acres for a well with a double Persian wheel.” Punjab Revenue & Agriculture, Agriculture, December 1888, A procs, #1, Punjab Archives, Lahore. For further discussion of changing British wasteland policies, see chapter 5.
68. Steedman, *Report on the Revised Settlement of the Jhang District*, 68–69.
69. According to the court record, his ancestors had originally acquired a claim to the land from the chief of the Sial tribe in the mid-eighteenth century.
70. *Punjab Record, 1868*, 159–66. Civil Judgements, Chief Court of Punjab, 1868, #64, Kaem Shah and others, Plaintiffs vs. Mohumda and others, Defendants.
71. Punjab Revenue, 17 April 1853, Procs. #98–102, Punjab Archives, Lahore.
72. Bhattacharya, “Pastoralists in a Colonial World,” 49–53. The term *pawindah* covered a large number of Pathan nomads (of varied tribal origins) who moved down into the Punjab plains with their herds, establishing camps in Dera Ismail Khan district. Some continued on into India to trade or to work as laborers; others took their flocks across the Indus into the Thal to graze. For a discussion, see Tucker, *Report of the Land Revenue Settlement of the Dera Ismail Khan District*, 184–92, and Capt. J. A. Robinson, *Notes on Nomad Tribes of Eastern Afghanistan* (1934; repr., Quetta: Nisa Traders, 1978).
73. Capt. N. W. Elphinstone, *Report on the Revised Settlement of the Googaira District* (Lahore: Koh-i-Noor Press, 1860), 34–35.
74. As the Jhang settlement officer noted, “Hindu shopkeepers attach themselves to all the large herds of cattle in the Bar in favourable years and buy up the ghi.” Steedman, *Report on the Revised Settlement of the Jhang District*, 107–13.
75. James B. Lyall, “Note on the Nature and Origin of Proprietary Right in the Mooltan Division,” Punjab Revenue & Agriculture, Revenue, August 1877, #12, Punjab Archives, Lahore.
76. *Ibid.*
77. Veena Sachdeva, *Polity and Economy of the Punjab during the Late Eighteenth Century* (New Delhi: Manohar, 1993), 56. Walidad had gained a reputation as a sinker of wells and builder of canals.
78. Cultivated by tenants, these lands helped to secure seasonal access to riverine grazing lands. They also provided income that helped to define hierarchies of family influence and patterns of clan conflict among the different lineages of the Kharrals.
79. Elphinstone, *Report on the Revised Settlement of the Googaira District*, 24–25.
80. *Ibid.*, 16; Charles A. Roe and W. E Purser, *Report on the Revised Land Revenue Settlement of the Montgomery District in the Mooltan Division, 1874* (Lahore: Central Jail Press, 1878), 39–40. For background on the history of the various branches of the Kharrals and their relationships to the *bar* and to the control of settled agricultural lands, see *Chenab Colony Gazetteer*, 16–17.
81. See Roe and Rattigan, *Tribal Law in the Punjab*, 6–8. For a full-blown (and highly idealized) discussion of the evolution of the patriarchal “village community” from nomadic roots, see Hugh Kennedy Trevaskis, *The Land of the Five Rivers: An Economic History of the Punjab from the Earliest Times to the Year of Grace 1890* (Oxford: Oxford University Press, 1928), 21–28.

82. Few predominantly pastoral groups thus found their way onto lists of “martial tribes,” and, indeed, many of these groups themselves resisted army recruitment. For an overview of army recruiting policies, see Tan Tai Yong, *The Garrison State: The Military, Government and Society in Colonial Punjab, 1849–1947* (Thousand Oaks, Calif.: Sage, 2005). It is interesting to compare these colonial views with Irfan Habib’s more recent suggestions that a nomadic past historically shaped the culture of settled agricultural society in the Punjab, as briefly discussed in chapter 1. Habib sees the cultural legacy of pastoralism (particularly as it influenced conversions to Sikhism) more as one of egalitarianism than of patriarchy.

83. Captain R. C. Temple, *The Legends of the Punjab* (1884; repr., Islamabad: Institute of Folk Heritage, 1981), III: 1–24. Roe and Purser, *Report on the Revised Land Revenue Settlement of the Montgomery District*, 44–45.

84. For a history of the tax, see “Report on the History of Tirni in Jhang” by Capt. G. W. Hamilton, 11 October 1851, Punjab Revenue, 13 December 1851, nos. 42–48, Punjab Archives, Lahore. Hamilton argues for a Sanskrit derivation of the term. According to the deputy commissioner of Multan, William Ford, the tax was not collected in Mughal times. Punjab Revenue, 16 October 1852, nos. 93–98, Punjab Archives, Lahore. For a good general history of tirni in the Punjab, see Brian Caton, “Settling the State: Pastoralists in Southwestern Punjab, 1840–1900” (Ph.D. diss. University of Pennsylvania, 2003).

85. “Report on the History of Tirni in Jhang” by Capt. G. W. Hamilton, 11 October 1851, Punjab Revenue, 13 December 1851, nos. 42–48, Punjab Archives, Lahore.

86. Steedman, *Report on the Revised Settlement of the Jhang District*, 162.

87. Report on Tirni in Pakpattan District by F. C. Marsden, 6 May 1852, Punjab Revenue, 16 October 1852, nos. 93–98, Punjab Archives, Lahore.

88. Temple did recognize that, for camels, which required larger grazing ranges, other measures were necessary, and for these he recommended continued dealings with sadar tirni guzars on government rakhs. Note by Richard Temple, 11 March 1852, Punjab Revenue, 16 October 1852, nos. 92–98, Punjab Archives, Lahore.

89. J. G. Barnes, Comm., Lahore to P. Melville, Sec. to Bd. of Admin., 26 February 1852, Punjab Revenue, 16 October 1852, nos. 92–98, Punjab Archives, Lahore.

90. Memorandum by Richard Temple on the Sheikhpura Bar, 26 January 1852; Note by R. Temple on the Allotment System, September 9, 1852, Punjab Revenue, 17 April 1852, #98–102, Punjab Archives, Lahore.

91. Mackenzie, *Report of the Revised Settlement of the Goojerat District*, 59.

92. For a good discussion of this, see Tucker, *Report of the Land Revenue Settlement of the Dera Ismail Khan District*, 257–76. In this connection, the courts held generally that even regular payment of tirni for grazing access to wastes within village boundaries did not give outside nonproprietors customary rights to a share in village commons in the same manner as the payment of land revenue in a village did. See Rustomji, *Treatise on Customary Law in the Punjab*, 658–59. (This 1916 case involved Patti Lak and went ultimately to the Privy Council.)

93. This was mauza Lak in Shahpur tahsil. In 1896, the settlement officer wrote that, in measuring off this area of the bar and assigning it to Lak, there had not in the beginning been the intention to “admit any claim of the few cattle-owners of Lak to this immense area.” Although part of it was later marked off to constitute the Kalra estate of Sahib Khan

Tiwana, the rest was included at settlement in the village estate. J. Wilson, *Final Report of the Forest Settlement of the Rakhs Situated in the Bhera and Shahpur Tahsils of the Shahpur District, 1896* (Lahore: Government Printing, 1938), 50. It was in the Thal generally that the largest areas of waste were attached to villages and that the village was most commonly used as a unit for the collection of *tirni*.

94. Steedman, *Report on the Revised Settlement of the Jhang District*, 105.

95. An example of this was the British use within the Multan *tirni* system of Malik Machhia Langrial, Ghulam Muhammad Daultana, and Sayyid Mehr Shah of Sarai Siddhu as the guardians of the Multan *bar* against cattle wandering in from outside. See C. A. Roe, DC Multan to H. E. Perkins, Comm & Super, Multan, 8 May 1882. Punjab Financial Commissioner, *Tirni Administration*, Selections from the Records of the Financial Commissioner's Office, no. LVI (Lahore: Civil and Military Gazette press, 1885), 97.

96. Survey operations in the wastes of government rakhs of course were expensive, and, as the Multan commissioner suggested early on, some chaks could only be demarcated by the boundaries formed "by roads or other well-known boundaries of tribes or castes." Brandreth to Sec. to Fin. Comms., 16 December 1869, Punjab Revenue, Agriculture & Commerce, July 1874, A Procs. #6 (*Tirni in Multan Division*), Punjab Archives, Lahore.

97. Indeed, the implied establishment of territorial rights in particular grazing tracts under this policy was suggested by the ultimate British willingness to award *tirni inams* to leading men among pastoral tribes when settlement infringed on their grazing grounds, *inams* that were awarded on precisely the same terms that land revenue *inams* were given to leading men among the agricultural population. Revenue and Agriculture (Land Revenue), December 1897, A procs., #31 (Conversion of *Tirni Muafis* in Jhang into Land Revenue Assignments), NAI. See also Punjab Financial Commissioner, *Tirni Administration*, 65, for an overview of the history of *tirni* under the British.

98. In fact, when the government collected statistics in Gugera district on the number of cattle owners who had rebelled and those who had not, it found that, though many cattle-owning tribes had joined the rebellion, many had not. But the cattle owners and their followers were still largely blamed for the disturbances. Punjab Revenue, 22 January 1859, #28a-30, Punjab Archives, Lahore.

99. Elphinstone, *Report on the Revised Settlement of the Googaira District*, 60.

100. A. Brandreth, Comm. & Super., Multan to DC's, Multan Division, 28 February 1871, Punjab Land Revenue, March 1871, #17 (25 March 1871), Punjab Archives, Lahore.

101. W. E. Purser, Settlement Officer, Montgomery, 19 April 1873, Punjab Revenue, Agriculture & Commerce, June 1873, A procs., #13, Punjab Archives, Lahore.

102. As Charles Roe wrote in also criticizing an excessively high *tirni*, "the *bar* tracts are at present suitable only for grazing. . . . Nor do I quite see why we should be so anxious to restrict grazing, which is useful enough in its way. Were the supply of cattle, and of milk and ghi, to be seriously diminished, the loss would be severely felt." Charles Roe, Settlement Off., Multan to DC, Multan, 28 August 1878, Punjab Financial Commissioner, *Tirni Administration*, 80.

103. D. G. Barkley, Comm & Super, Multan to F. C. Channing, Settlement Sec. to Fin. Comms, 3 October 1881, Punjab Financial Commissioner, *Tirni Administration*, 85.

104. For a history of the Multan system up to the 1880s, see C. A. Roe, DC Multan to H. E. Perkins, Comm. & Super., Multan, 8 May 1882, Punjab Financial Commissioner, *Tirni Administration*, 92-98.

105. H. C. Cookson, DC Multan to Comm & Super, Lahore, 7 May 1890, Revenue & Agric, Revenue, A procs., September 1891, #5–7, Punjab Archives, Lahore.

106. Quoted in *Shahpur District Gazetteer, 1897* (Lahore: Civil and Military Gazette Press, 1897), 228. The lineages involved here include some lineages of the Tiwanas, whose subsequent roles in patronizing irrigation is discussed in more detail in chapter 4.

CHAPTER 4. STATUTE AND CUSTOM IN WATER LAW

1. J. D. Tremlett, Officiating DC Muzaffargarh to Settlement Off., Muzaffargarh, 7 April 1874, “Management of the Inundation Canals in the Muzaffargarh District,” IOL (emphasis in original).

2. Muhammad Shah, “Shukriya Anhar Ferozepore” (Thanksgiving for the Ferozepore Canals), *Ferozepore District Gazetteer, 1915*, appendices, xviii–l.

3. Lt.-Col. Arthur Cotton, *Public Works in India* (London: W. H. Allen, 1854), 293. In fact, the first half of the nineteenth century had witnessed some large irrigation projects in India, including the Ganges canal. For a discussion of the history of the Ganges canal, see Ian Stone, *Canal Irrigation in British India: Perspectives on Technological Change in a Peasant Economy* (Cambridge, Engl.: Cambridge University Press, 1984), 2–67.

4. Cotton, *Public Works in India*, 11.

5. For an overview of the history of water legislation in colonial India, see Iqbal Ahmed Siddiqui, “History of Water Laws in India,” in *Water Law in India*, ed. Chhatrapati Singh (New Delhi: Indian Law Institute, 1992), 289–319.

6. Whitcombe, “Irrigation,” 699.

7. Statement by H. S. Maine on the Objects and Reasons of Act XXX of 1871, the Punjab Canal and Drainage Act, 21 September 1869, Proceedings of the Governor-General in Council, 21 January 1870, IOL, L/P&J/3/1298—Legislative Despatches, #9.

8. Proceedings of the Governor-General in Council, 21 January 1870, IOL, L/P&J/3/1298—Legislative Despatches, #9. Strachey’s comments preceded the passage of Act XXX of 1871, the Punjab Canal and Drainage Act, which failed for technical reasons to receive the sanction of the secretary of state for India and was shortly replaced by Act VIII of 1873.

9. The quote is from George Davidson, who in the 1870s was a member of a commission appointed by the U.S. government to study irrigation abroad. Quoted in James L. Wescoat, Jr., “Water Rights in South Asia and the United States: Comparative Perspectives, 1873–1996,” in *Land, Property and the Environment*, ed. John F. Richards (Oakland: Institute for Contemporary Studies, 2001).

10. Comments of F. R. Cockrell, Proceedings of the Governor-General in Council, 26 October 1871. Proceedings of the Governor-General in Council, 21 January 1870, IOL, L/P&J/3/1298—Legislative Despatches, #9.

11. Statement by H. S. Maine on the Objects and Reasons of Act XXX of 1871, the Punjab Canal and Drainage Act, 21 September 1869, Proceedings of the Governor-General in Council, 21 January 1870, IOL, L/P&J/3/1298—Legislative Despatches, #9.

12. See Chhatrapati Singh, *Water Rights and Principles of Water Resources Management* (Bombay: N. M. Tripathi, under the auspices of the Indian Law Institute, 1991), 24.

13. These parallels were suggested clearly some years later by F. W. Schonemann, a Punjab engineer. Drawing on his own experience from Spain, Schonemann argued that such

views reflected a “principle” of water law that had been introduced into the Indus basin by “the Muhammadan conquerors”: “Flowing streams are public, and their only proprietor, God.” Such ideas were reflected, he noted, in many seemingly customary arrangements for water distribution. “We find the same principle established in the Salt Range and on the North-West Frontier of India, as a law known as *saroba paina*, under which every riparian land owner is entitled to take, from any flowing stream, such water as he *needs* and is able to divert on to his own lands” (emphasis added). Schonemann contrasted these ideas sharply with the formal framing of law in terms of rights and responsibilities, an approach he saw as deriving from Roman law. Note by F. W. Schonemann, Superintending Engineer, Lower Jhelum Circle, on the Shahpur Branch Canal Project, 8 May 1914, Punjab PWD, Irrigation, #38 of 1914. See also F. W. Shonemann, *Report on a Tour of Inspection of Certain Engineering Works in Spain and France during the Year 1913* (Lahore: Punjab Public Works Department, Irrigation Branch, 1914).

14. See Chhatrapati Singh, “Water Rights in India,” in Singh, *Water Law in India*, 13. This was the case, he implies, even if actual rights of ownership in water were missing. “Given the ontological status of water; that is its special legal nature [as a part of nature that cannot readily be ‘owned’], any claim to property or absolute rights over it can at best remain a *de facto* expression of power, and an unrealizable legal fiction, *de jure* that is in real law.” As a result, he writes, “the only kind of rights that can become operative for anyone are usufructory rights, that is the right to use of water. The real question, therefore, is who has what kind of right to use water, and what corresponding duties attach to it.” This was, in fact, the form that “rights” under the Canal Act took. *Ibid.*, 26–28.

15. Major-General W. H. Gulliver, R.E., Joint-Secy. To Govt., Punjab, P.W.D., Irrigation Branch, to Sec. To Fin. Comm., Punjab, 26 March 1879, Punjab Rev., Ag. & Commerce procs, April 1879, #7, IOL.

16. Whitcombe, “Irrigation,” 690.

17. Pooling of resources was particularly common in the construction of Persian wheels. In arid areas, investment in wells represented the most important capital expenditure in opening the land to cultivation. See, e.g., R. H. Davies and W. Blyth, *Report on the Revised Settlement of the Umritsur, Sowrian, and Turun Tarun Purgunnahs of the Umritsar District* (Lahore: Hope Press, 1860), 40–41.

18. Saunders, *Report on the Revised Land Revenue Settlement of the Lahore District*, 45.

19. As the settlement officer of Gugaira noted, “[A]s the number of ‘Varees’ to which a proprietor is entitled within a certain time represents his share of the property in the well, this term is very commonly employed instead of the word ‘hissa,’ or share, with reference to the land attached to the well.” Elphinstone, *Report on the Revised Settlement of the Googaira District*, 43. See also Steedman, *Report on the Revised Settlement of the Jhang District*, 77.

20. “So important are the rights in wells, usually hereditary, following the same law as the right in the soil,” one settlement officer in Ludhiana District noted, “that a complete statement of the sub-division of property in each well forms part of the settlement record.” Tupper, *Punjab Customary Law*, III: 179.

21. Some of the *wajib-ul-arz* for villages in Ambala district along the Western Jumna canal, for example, contained entries detailing the structure of turns for access to canal water. See Collection of Abstracts of the *Wajib-ul-arz* for Villages in Jagadhri Tahsil, Punjab BOR, Lahore, File no. 251/17 KW. A sample *wajib-ul-arz* entry from mauza Kharkauli gives a flavor

of the nature of these entries. This was a former jagirdari village divided into ten and a half shares, controlled largely by two major landowners: "There is no 'pacca' well fit for irrigation, but a channel flows from the Jumna Canal, which has water running in it all year round. . . . In case of water being plentiful everyone can have irrigation in proportion to his wants. But in times of draught, or in summer or when there has arisen any dispute, the irrigation can be had according to shares by turns to be fixed thereon. Those shareholders that had their first turns by day have their second turns by night. Lottery decides as to which of the shareholders will have his turn first. . . . But when any one's field looks unusually dry, irrigation is allowed him then as much as he can claim according to share regardless of the above system. The landlords and tenants can have their fields irrigated along with their respective 'pattis.' The cost of cleaning and manual labor is counted on those very 10½ shares. The landlords have only that part of the canal cleared which is just in front of their fields."

22. These shares did not imply that there were always actual genealogical connections between the sharers, for in some cases the original shareholders in a well might have been unrelated. See Davies and Blyth, *Report on the Revised Settlement*, 55, 41.

23. Saunders, *Report on the Revised Land Revenue Settlement of the Lahore District*, 43–46.

24. P. D. Alexander, Executive Engineer, 2nd subdivision, 1st Division, Bari Doab Canal, to Joint-Secretary to Government of Punjab, PWD, Irrigation, 29 January 1879, Punjab Revenue, Agriculture & Commerce procs, April 1879, #7, IOL.

25. *Ibid.*

26. One could add that scattering of land was itself an adaptation to environmental circumstances but not one that helped to facilitate government adaptation to local community in water delivery. In this sense, the village-wide management of canal water was far more complex than the administration of wells, around which the holdings of sharers were more localized. The difficulties in managing cooperation in local canal water distribution were well recognized by officials from an early date; see, e.g., the comments of R. M. Cust in R. H. Davies, *Report of the Revised Settlement of the Greater Part of the District of Gurdaspur* (Lahore: Punjabee Press, 1859), 81.

27. This was governed by Section 68 of the Canal Act. See Engr. Sardar A. D. Nasir, *A Practical Treatise on Analytical Study of the Canal and Drainage Laws in Pakistan* (Lahore: Mansoor Book House, 1988), 124–51.

28. Whitcombe, "Irrigation," 686–87.

29. Lyall's ideas, as described in this and the following paragraphs, were (except as noted) put forward in Memorandum by J. B. Lyall, Esq., Financial Commissioner, Punjab, 2 August 1882, Punjab Rev. & Agric., Irrigation, November 1882, #1, IOL.

30. Such reviews were undertaken in the course of settlement in a number of areas, and results tended to be somewhat different, not simply because of different local circumstances but because of different notions about what actually constituted state "direction" in the original construction of canals. See, e.g., F. W. R. Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District*, 58.

31. Lyall to Settlement Sec., 19 July 1876, "Management of the Inundation Canals in the Muzaffargarh District," IOL.

32. Rather than intervene, many officials thus criticized local irrigators for failing to properly keep up small canals. See, e.g., the comments of the settlement officer of Gujrat,

who criticized “the usual apathy and procrastination” of villagers in managing the small canals (*kuhls*) in the northeastern part of Gujrat district as a source of their deterioration. Mackenzie, *Report of the Revised Settlement of the Goojerat District*, 77–79.

33. This was the precise language of the Punjab Laws Act of 1872, which had established the system of customary law in the Punjab. Memo. by J. B. Lyall, Esq., Financial Commissioner, Punjab, 2 August 1882, Punjab, Rev. & Agric., Irrigation, November 1882, #1, IOL.

34. This legislation was the Punjab Minor Canals Act of 1905, discussed at the end of this chapter.

35. For a physical description of the Degh, see Report by M. Ghulam Ahmad Khan, Settlement Collector, enclosed in Col. J. A. L. Montgomery, Div. Judge, Delhi Division, to S. S. Thorburn, Comm. and Super., Rawalpindi Div., 6 August 1895, in Punjab Financial Commissioner, *Papers Relating to the Irrigation Works in the Sialkot District*, Selections from the Records of the Office of the Financial Commissioner, Punjab, no. 17, new series (Lahore: Civil and Military Gazette Press, 1895), 1830. See also Saunders, *Report on the Revised Land Revenue Settlement of the Lahore District*, 49.

36. Pahars and gharis were indigenous units of time. A pahar was approximately three hours, and a ghari, though locally variable, was probably a little over half an hour. For a brief discussion of these time units in Indus basin irrigation, see Gurnam Singh Sidhu Brard, *East of Indus: My Memories of Old Punjab* (New Delhi: Hemkunt Publishers, 2007), 147–49.

37. See Saunders, *Report on the Revised Land Revenue Settlement of the Lahore District*, 43–46, appendix I (i–x).

38. There was evidence in the “agreement” of earlier court interventions in these matters. Over the long term, small-scale canal building along the Degh in Sialkot district may have undermined cold season flow downstream. See Michael O’Dwyer, *Preliminary and Assessment Reports of Tahsil Gujranwala in the Gujranwala District* (Lahore: Civil and Military Gazette Press, 1891), 3–4.

39. J. Mark Baker, *The Kuhls of Kangra: Community-Managed Irrigation in the Western Himalaya* (Seattle: University of Washington Press, 2005).

40. See Baker, “Colonial Influences on Property, Community, and Land Use.”

41. Baker, *Kuhls of Kangra*, 107–11.

42. According to Lyall, there were, altogether, 743 kuhls. For an analysis of the process of preparing these registers, see J. Mark Baker, “The Politics of Ecological Knowledge: The Case of British Colonial Codification of ‘Customary’ Irrigation Practices in Kangra, India,” *Himalayan Research Bulletin* 21, no. 2 (2003).

43. To these were added records for each mauza, “showing the custom as between members of the community in respect of their share of a big canal, or in respect of a canal or stream irrigating their village only, the mouth of each duct, the instrument used for dividing the water, etc.” Lyall allowed as how many of these customs were quite vague, but he suggested hopefully that they formed the “foundation on which a good record can be built up in time.” James B. Lyall, *Report of the Land Revenue Settlement of the Kangra District, 1865–72* (Lahore: Central Jail Press, 1874), 243.

44. Baker, “Politics of Ecological Knowledge.” In his settlement report, Lyall provides a description of the kohli and his staff (which comes from Kulu, but which captures the pattern elsewhere in Kangra district). The bigger kuhls had four officers, in addition to the kohli (called a *bandu* in Kulu); there was also a daroga (work superintendent), a messenger,

and a drummer. When repairs were needed, it was the daroga who sent the messenger and drummer to the villages to collect labor. Each family that took water supplied one laborer or else paid a fine, which was collected by the kohli. The kohli's "special business," in addition, was to "superintend the daily distribution of the water." Lyall, *Report of the Land Revenue Settlement of the Kangra District*, 141.

45. Baker, *Kuhls of Kangra*, 112.

46. *Kangra District Gazetteer, 1924–25* (Lahore: Government Printing, 1926), 280.

47. Baker, "Politics of Ecological Knowledge."

48. Anderson added that the kohlis also "have many opportunities of making money by allowing a side channel to run too long and so on, and the post is often in great demand." Alexander Anderson, *Final Report of the Revenue Settlement of Kangra Proper, 1897* (Lahore: Civil and Military Gazette Press, 1897), 7.

49. As Baker puts it, "state engagement with kuhl regimes has both weakened and strengthened their durability." Baker, *Kuhls of Kangra*, 215.

50. Anderson, *Final Report of the Revenue Settlement of Kangra*, 7.

51. For the British recording of "Codes of Irrigation Rights and Customs" (*Rivaj-i Abpashi*) in Peshawar to try to stabilize their control over older forms of irrigation, see Hastings, *Report of the Regular Settlement of the Peshawar District*, 271–86.

52. *Bannu District Gazetteer, 1883–4* (repr., Lahore: Sang-e-meel Publications, 1989), 100–121.

53. *Punjab Record*, Criminal Judgments, February 1889, #4 (Rasul and Others v. The Empress), 7–37.

54. The Swat river canal alone opened significant new areas for settlement and brought over 100,000 acres of land in Peshawar district under bureaucratically controlled structures of irrigation. See *Peshawar District Gazetteer, 1897–98* (repr., Lahore: Sang-e-meel Publications, 1989), 348–59. For a fuller discussion of this, see Nichols, *Settling the Frontier*, 208–12.

55. As elsewhere, such registers recorded the rights of certain villages to build dams for diversion of canal water, to fix water turns (during times of water shortage), and to put wheels (jhalars) into canals to raise water. They also noted those channels whose silt clearances were the responsibility of local irrigators and whose were the responsibility of the state, and those with local watermasters (here called maimars) appointed by the people themselves (as contrasted with those whose maimars were appointed by the government). See Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District*, 58. I have not seen the actual *Haquq-i Abpashi* registers. But the nature of the entries is suggested clearly by the sample tables in appendixes VI, VII, and VIII of Fryer's 1871 report on the history of the Dera Ghazi Khan canals. Appendix to Punjab Agriculture, Revenue and Commerce, September 1872, no. 15, IOL.

56. Importantly, this related not just to the protection of Baloch rights but also to restraints on the power of tribal chiefs as they had laid claim to water irrespective of the rights of Jats and others. For a discussion of problems relating to water rights on the Manka canal after it was extended by Jamal Khan Leghari, see Fryer, *Final Report of the First Regular Settlement of the Dera Ghazi Khan District*, 57–58.

57. A. H. Diack, *Final Report on the Revision of Settlement of the Dera Ghazi Khan District (1893–97)* (Lahore: Civil and Military Gazette Press, 1898), 54; Report by F. E. Gwyther, Ex. Eng., Indus Canal, 15 May 1899, Punjab Revenue & Agric., Irrigation, April 1900, #45;

Deputy Commissioner, DGK (P Thompson) to Ex Eng, 3 May 1899, Punjab Revenue & Agric., Irrigation, April 1900, #45, IOL.

58. H. C. Beadon, Deputy Commissioner, DGK to Commissioner and Superintendent, Derajat, 13 June 1899, Revenue and Agriculture (Land Revenue), October 1901, A procs, #24–28, NAI.

59. *Dera Ghazi Khan District Gazetteer, 1897–98* (Lahore: Civil and Military Gazette Press, 1898), 176.

60. Diack, *Final Report on the Revision of Settlement of the Dera Ghazi Khan District*, 54.

61. Emphasis in original. The case related to the Takwara torrent. Ironically, the resolution in this case may have mirrored the actual pattern of irrigator relations with the state in the pre-British period, but this was hardly an argument in favor of customary registers. R. G. Thomson, Rev. Sec., Punjab, to Sr. Sec. to Fin. Comms, 26 July 1892, Punjab Revenue & Agric., Irrigation, August 1892, A procs, #7–17, Punjab Archives, Lahore.

62. Muhammad Asif Kamran and Ganesh Prasad Shivakoti, “Design Principles in Tribal and Settled Areas Spate Irrigation Management Institutions in Punjab, Pakistan,” *Asia Pacific Viewpoint* 54, no. 2 (Aug. 2013): 206–17. Kamran and Shivakoti make particular use of Elinor Ostrom’s “design principles” for effective common resource management. See Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (New York: Cambridge University Press, 1990).

63. Bombay, *Official Correspondence on the Abolition of Statute or Forced Labour in Sind*. In fact, the 1873 Canal Act did not apply to the Bombay presidency, of which Sind was a part. But the general principles of the act were embodied in separate legislation, the Bombay Irrigation Act (VII or 1879), which governed irrigation in Sind. See Nasir, *Practical Treatise*, 421–48.

64. Memo of J. G. Fife, Undersecretary to Govt., 24 January 1871, Bombay Public Works Dept., Irrigation, no. 125 of 1871, vol. 753 of 1868–1890, Maharashtra State Archives, Bombay.

65. Memo by J. B. Lyall, Financial Commissioner, Punjab, 2 August 1882, Punjab Revenue and Agriculture, Irrigation, November 1882, #1, IOL.

66. Demi-official letter, Jr. Sec. to Govt, Punjab to Sr. Sec. to Fin. Comm, Punjab, 8 June 1887, Punjab Revenue and Agriculture, Irrigation, November 1888, #1–4, Punjab Archives, Lahore.

67. H. Garbett, Superintending Engineer, Derajat Circle, *Report on Canal Irrigation in the Muzaffargarh District*, 12 April 1871, p. 6, Punjab Archives, Lahore.

68. J. H. Morris, “Report on the Inundation Canals of the Mooltan District,” submitted with letter dated 18 September 1858, Punjab Revenue Procs., 11 December 1858, #9–14, Punjab Archives, Lahore.

69. “Management of Inundation Canals in Muzaffargarh,” p. 7, IOL.

70. Although government officials in most cases maintained these rolls, they were often manipulated to maximize labor available for canal clearance. As one official admitted, it was usually easier to get into a local community of irrigators on an inundation canal than to get out of it: “It was easy enough to get brought on the roll of irrigators,” the settlement officer of Muzaffargarh wrote, “but almost impossible to get removed from it, and, consequently, from the obligation to supply labor.” “Papers on the Inundation Canals in the Muzaffargarh District,” in Punjab Financial Commissioner, *Papers Relating to Canals*, Selections from the Records of the Financial Commissioner’s Office, no. LXII (Lahore: Civil and Military Gazette Press, 1887), 608.

71. As noted in chapter 1, irrigators could normally also commute their chher obligations into cash payments, which went into a zar-i nagha fund for the hiring of substitute laborers.

72. Edward O'Brien, *Report of the Land Revenue Settlement of the Muzaffargarh District of the Punjab, 1873–1880* (Lahore: Central Jail Press, 1882), 3. See also E. O'Brien, Settlement Off., Muzaffargarh to Settlement Comm., Punjab, 4 July 1874, "Management of Inundation Canals in Muzaffargarh," p. 15, IOL.

73. "Management of Inundation Canals in Muzaffargarh," p. 21, IOL.

74. Report by Gholam Murtaza, Superintendent of Alipur (trans. by E. O'Brien); Report by Mir Nisar Ali, Extra Assistant Settlement Off. (trans by O'Brien), "Management of Inundation Canals in Muzaffargarh," pp. 17–18, 19, IOL. It was, as one official noted, not state policy but "custom," the tradition of "community" payment of mirabs, that placed water distribution to an important degree under the influence of the men recognized by the British as "leading irrigators." "A good deal of the mirab's time is taken up in collecting his grain," a Multan official wrote. "Being a servant of the irrigators, [the mirab] is not likely to report breaches of the rules on their part." W. Stevens, Ex. Eng., Lower Sutlej and Chenab Division, to DC Multan, 25 May 1882, Punjab Revenue and Agriculture, Irrigation, September 1882, #4, IOL.

75. This can be seen, e.g., in village statements at settlement in some districts revealing the numerous villages that have "suffered from unequal distribution of canal water." See, e.g., O'Brien, *Report of the Land Revenue Settlement of the Muzaffargarh District*, appendix IV ("General Statement by Village"), lxxv.

76. Col. J. Crofton to Sec. to Govt., Punjab, 9 March 1875, Punjab Rev, Agric & Commerce, September 1875, #8, IOL.

77. Skemp, *Multan Stories* (1917; repr., Lahore: Panjabi Adabi Laihr, 1982), 56–61.

78. *Ferozepore District Gazetteer*, 17–18, 159, 164–65, 212.

79. "Papers as to Inundation Canals in the Ferozepore District," in Punjab Financial Commissioner, *Papers Relating to Canals*, 622.

80. Grey and Grey, *Tales of Our Grandfather*, 223. This was critical not only to the success of his plans but also to keep the Irrigation Department at bay. As he continued: "I induced [the engineer] to go over my proposed works in 1874. This was not only for his advice, but to obtain such endorsement of my plans by a professional engineer of repute and Member of the Institute, as should reconcile the Government Department of Public Works to a layman's intrusion on their domain."

81. Colonel L. J. H. Grey, *Manual of Construction and Management of District Canals* (Lahore: Punjab Government Press, 1885), 27 (emphasis in original).

82. It no doubt pleased the British in general, for they reprinted it in translation in the district gazetteer.

83. Muhammad Shah, lambardar of Gurdittiwala, "Shukriya Anhar Ferozepore" (Thanksgiving for the Ferozepore Canals), *Ferozepore District Gazetteer*, Appendices (in Punjabi, with translation), pp. xxiv–xxvii.

84. *Ibid.*, xxxv–xxxviii.

85. Memorandum by Babu Maya Das, EAC, 6 March 1883, "Papers Relating to Canals," *Financial Commissioners Selections*, LXII (Lahore, 1887), Section III, part B (Papers as to the Proper Method of Clearing Inundation Canals), p. 524.

86. Grey, *Manual of Construction*, 14–18, 28–32.

87. *Ibid.*, 16, 27.

88. Grey blamed the lieutenant-governor for abetting such conflicts, and in the end he took solace that, in spite of the government's responding with an investigation of his efforts and temporarily transferring him out of the district, his project was nevertheless completed, and it won over many of the objectors. By Grey's own account, his efforts were redeemed by unusually low rainfall in the succeeding season, which vindicated those who had cooperated in canal construction. Grey and Grey, *Tales of Our Grandfather*, 218–24.

89. See M. L. Currie, *Report on the Condition and Future Management of the Grey Canals of Ferozepore District, 1913* (Lahore: Punjab Government Press, 1913). Such criticisms had begun almost as soon as the first group of Grey canals had been completed. See Punjab Rev., Agric. & Commerce, Oct. 1875, A, #1 (Ferozepore Canals), Punjab Archives, Lahore.

90. E. B. Francis, Settlement Officer, Ferozepore to Comm & Super, Jullundur Div., 17 January 1889, Punjab Rev. & Agric., Irrigation, May 1889, No. 1, IOL.

91. Each village was in theory responsible collectively for clearing their dakh (or for contracting the work), but the system faced severe stresses in the face of technical and distributional problems that meant that some villagers encountered heavy and expensive clearances out of all proportion to their return, while others reaped rewards out of all proportion to their inputs. For a general discussion of the long-term problems of the canals, see S. N. Herdon, superintendent, Grey Canals, quoted in Currie, *Report on the Condition and Future Management of the Grey Canals*.

92. *Ferozepore District Gazetteer*, 187.

93. Aitchison noted that “whatever system is adopted, must be so framed as to be popular with the irrigators themselves, for unless the element of popularity is present, continued success in the working of inundation canals must always be problematical.” Proceedings of the Lieutenant-Governor, Revenue (Irrigation), #43, 6 August 1885, printed in Grey, *Manual of Construction*, 1–7.

94. As Herbert Edwardes tells it, Diwan Sawan Mal offered a ten thousand rupee reward and the right to collect the taxes of the Khai locality in Mailsi tahsil to anyone who could increase the revenue of the area by building a canal. Ghulam Mustafa Khan took up the offer and, by constructing a canal, managed to more than quintuple the area's revenue in three years—though Sawan Mal failed, according to Edwardes, to provide the promised reward. Herbert B. Edwardes, *A Year on the Punjab Frontier, in 1848–49* (London: Richard Bentley, 1851), II: 14–15. For an account of Ghulam Mustafa Khan and the Multani Pathans in general, and of early British canal administration in Multan, see J. Royal Roseberry, *Imperial Rule in Punjab: The Conquest and Administration of Multan, 1818–1881* (Riverdale, Md.: Riverdale Co., 1987), 71–73, 100–105, 153–57.

95. Edwardes's comments come from a testimonial written in 1869. See Rev. and Agric. (Land Revenue), February 1905, part C, nos. 2–3 (testimonials attached to petition of Ahmad Yar Khan Khakwani and others), NAI.

96. This was a huge block of largely uncultivated land, almost 500,000 acres. The Mailsi bar was an area of very limited rainfall (an average of less than six inches per year). Nevertheless, it was a region in which semi-pastoralists practiced periodic rainfed cultivation in the depressions and hollows, called *dhoras*, that were scattered amid barren grazing lands in the bar. “No form of cultivation,” wrote the settlement officer, “can well be conceived more variable and uncertain than this rain cultivation of the Mailsi Bar.” E. D. Maclagan, *Assess-*

ment Report of the Mailsi Tahsil of the Multan District, 1900 (Lahore: Civil and Military Gazette Press, 1900), 6.

97. Most of the cultivators on the Hajiwah canal appear to have come from the nearby pastoral tribes, though some may have come from further afield; according to the 1900 Mailsi assessment report, some of the cultivators came also “from the decaying villages of the lower Ravi.” Maclagan, *Assessment Report of the Mailsi Tahsil*, 27. For those who took up cultivation on newly watered Hajiwah lands, Ghulam Kadir Khan asked only for a share of the crop taken in kind (*batai*). As one executive engineer put it, “[H]e shares the profit and loss with the cultivators. Whatever the condition of the crop, whether good or bad, he takes his share. If the crop is a failure, it is a loss to both.” Memorandum by R. O’Brien, Executive Engineer, Lower Sutlej and Chenab Division, Inundation Canals, to Superintending Engineer, Upper Bari Doab Circle, 20 June 1876, Punjab Rev., Agric. & Commerce, October 1879, IOL. Cultivation on these terms required no immediate break with a semi-pastoral lifestyle. However, the khan used his water control as a tool to keep tenants in line, and he chafed at attempts either by pastoral leaders or by the British courts to compromise his direct relations with them or his ability to use coercion to gain his ends. He was, as James Lyall put it, “more feared than liked in this country,” and “till some of his agents were convicted and punished, they were in the habit of extorting fines for so-called cattle trespass by illegally imprisoning the herdsmen in his houses on the Hajiwah lands.” Memorandum by James B. Lyall, Punjab Rev, Agric. and Commerce, Oct. 1879, IOL.

98. Punjab Rev., Agric. and Commerce, Oct. 1879, IOL. Ghulam Mustafa Khan had initially paid Rs. 750 a year for his *bar barani* lease (on rain-fed tracts in the *bar*), but the new Khakwani estate was now assessed at Rs. 15,000 a year, with Rs. 5,000 remitted for Ghulam Kadir’s life and that of an heir as an inam, in recognition of “the general loyalty and good service to Government of the said grantee and more especially in recognition of his energy and enterprise in digging the Hajiwah canal.” Quoted in Privy Council, Ahmad Yar Khan and Others, Plaintiffs, and The Secretary of State for India in Council and Another, Defendants, *Indian Law Reports*, Calcutta Series, Vol. XXVIII (1901), 695–709.

99. Maclagan, *Assessment Report of the Mailsi Tahsil*, 33 and his attached “Map of the Mailsi Tahsil, District Multan, Showing Distribution of Tribes.”

100. In the words of a *robkar* (letter) issued by the deputy commissioner: “From time to time [Ghulam Kadir Khan] made some kassis (minor canals) from the [Hajiwah] nala, sometimes himself and sometimes through his relatives, friends, and dependents.” Translation of a *Robkar*, dated 25 January 1882, issued by the Court of C. A. Roe, DC Mooltan, attached to the file of Case. No. 441, relating to the Nala Hajiwah, Tahsil Mailsi, Ghulam Kadir Khan v. Muhammad Afzal Khan, Document no. 30, Privy Council, case #10 of 1900, on appeal from the Punjab, Ahmad Yar Khan and Others (Plaintiffs), Appellants, and the Secretary of State for India and Another (Defendants), Respondents, Evidence Volume, p. 48, Lincoln’s Inn Library, London.

101. Note by Lieutenant-Colonel J. W. Ottley, Chief Engineer, Irrigation Works, Punjab, on the Hajiwah Canal Case, 15 May 1891, Punjab Rev. and Agric., Irrigation, March 1904, Nos. 15–21, IOL. Memorandum by James B. Lyall, Punjab Rev., Agric. and Commerce, Oct. 1879, IOL.

102. The form of this deed was apparently influenced by ongoing provincial discussion of state interest in private canals in the Punjab at this time, a discussion relating in particular to the Shahpur canals of the Tiwanas and Noons (see chapter text).

103. Translation of petition from Muhammad Yar Khan Khakwani, 16 November 1888, and Memo. on the Dispute between the Sons of the Late Ghulam Kadir Khan, included in Major J. B. Hutchinson, DC, Multan to Comm. and Super., Lahore Div., 13 December 1888, Punjab Rev. and Agric., Revenue, June 1892, file no. 23, IOL.

104. Punjab Rev. and Agric., Revenue, June 1892, IOL.

105. Evidence of Dadu Khan, Lambardar, Joia of Jamlera (Montgomery district), Document #10, Privy Council, case #10 of 1900, on Appeal from the Punjab, Ahmad Yar Khan and Others (Plaintiffs), Appellants, and the Secretary of State for India and Another (Defendants), Respondents, p. 26, Lincoln's Inn Library, London.

106. Evidence of Sayad Haider Shah, owner of a canal on the Ravi. *Ibid.*, pp. 24–26.

107. Privy Council, Ahmad Yar Khan and Others, Plaintiffs, and the Secretary of State for India in Council and Another, Defendants, *Indian Law Reports*, Calcutta Series, Vol. XXVIII (1901), 695–709.

108. Such contradictions were also evident in British commentary on the Khakwanis. Although the most skilled Khakwani managers—from Ghulam Mustafa Khan to Ghulam Kadir Khan to Ahmad Yar Khan—had been viewed by the British as “able” and “energetic,” yet, as they pursued their litigation against the British, they were also frequently labeled as “sharp” and “grasping,” thus suggesting the conflicting—and conceptually opposing—characteristics that the British had projected on them. In the wake of the Privy Council's decision, local officials in Multan responded by opening negotiations with the Khakwanis for the purchase of their rights and for the payment of compensation—negotiations that dragged on for decades (and will be further discussed in chapter 6).

109. Denzil Ibbetson, *Punjab Castes* (1916; repr., Lahore: Sh. Mubarik Ali, 1982), 149.

110. Many had gained land grants under the Sikhs, which the British generally allowed them to keep. They were also given inams and jagirs for their military aid to the British. For an overview of the history of the Tiwanas, see Griffin and Massy, *Chiefs and Families of Note*, II: 168–83. See also Ian Talbot, *Khizr Tiwana: The Punjab Unionist Party and the Partition of India* (London: Curzon Press, 1996), 16–26.

111. A good summary of this background is in James Wilson, *Assessment Report of the Jhelam and Bar Circles of the Bhera Tahsil* (Lahore: Punjab Government, 1890), 58–69.

112. For a description of the canal, see D. C. MacNabb, DC Shahpur to Comm., Rawalpindi, 13 November 1860, Punjab BOR, file 251/5.

113. As the deputy commissioner of Shahpur (MacNabb) had noted in 1860, many of Sahib Khan Tiwana's initial tenants were men who had cultivated the wastes of the estate on an occasional basis with Jhelum flood waters before the canal brought a more dependable water supply. D. C. MacNabb (DC Shahpur) to Comm., Rawalpindi, 13 November 1860, Punjab BOR, file 251/5. Others were probably pastoralists or semi-pastoralists. The precise terms on which leases were converted to proprietary estates varied somewhat. Though originally this occurred after fifteen years if two-thirds of the land were cultivated, the British later required that proprietary right be acquired by purchase “at a fair and reasonable price.” For the leases of the Noons, see Rev. & Agric. (Land Revenue), December 1897, A procs., #28–9, Punjab Archives, Lahore.

114. Note by S. S. Thorburn, Comm. & Super., Rawalpindi, 31 March 1894, Punjab PWD, Irrigation, file no. 245 of 1906, Punjab Public Works Secretariat, Lahore. By the early 1880s,

there were twenty-four inundation canals in the district taking off from both the Chenab and the Jhelum, five paid for and administered by the government, and nineteen private (of which the four largest in terms of irrigated area were the canals of the three leading Tiwanas and that of the Noons). For a table of all these private canals, see Statement Giving Particulars of Private Canals in the Shahpur District, Punjab Rev. & Agric, Irrigation, September 1885, A procs, no. 6. (pp. 8–11), Punjab Archives, Lahore.

115. For the histories of these families, see Griffin and Massy, *Chiefs and Families of Note*, II: 167–83 (Tiwanas of Mitha Tiwana), 189–92 (Malik Mubariz Khan, Tiwana, of Jahana-bad), 193–94 (Nawab Malik Khuda Bakhsh Khan, Tiwana, of Hamoka). Some notion of the profitability of these estates can be gleaned from British estimates of the annual incomes that they generated in 1916:

Kalra estate (Malik Umar Hyat Khan, s/o Sahib Khan of Mitha Tiwana) . . .	Rs. 100,000
Khwajabad estate (Nawab Khuda Bakhsh Khan, s/o Sultan Mahmud Khan of Hamoka) . . .	Rs. 35,000
Jahanabad estate (divided between the sons of Malik Jahan Khan of Hadali):	
Nawab Mubariz Khan . . .	Rs. 50,000
Malik Mumtaz Khan . . .	Rs. 50,000

F. Popham Young, Comm., Rawalpindi Div. to B.T. Gibson, DC Shahpur, 3 December 1916, Punjab BOR, file no. 253/5/19/3. The wealth of the Kalra estate, in particular, was enhanced during a period under the Court of Wards (during Umar Hyat Khan's minority) when surpluses were invested in the purchase of new lands and in loaning money to other estates.

116. These were estimates prepared by M.S. Leigh, the Shahpur settlement officer, in 1914, during an inquiry on the value of these private canals. The figures for all of Shahpur's private canals were 19,000 acres irrigated on canal owners' own estates as compared to 13,500 acres irrigated on land owned by others. Punjab BOR 251/266 (Acquisition of Shahpur Private Canals and Completion of the Shahpur Branch). In some cases, the maliks invested in canals that were built primarily for chaharmi income, sometimes in partnership with other men of capital, including Hindu traders. A good example is Malik Sahib Khan Tiwana's six-mile-long Chaharmi canal, built in 1870 *only* for chaharmi income. Wilson, *Assessment Report of the Jhelam and Bar Circles*, 69.

117. H. E. Perkins, Comm. & Super., Rawalpindi to Sr. Sec. to Fin. Comm., 21 October 1884, Punjab BOR, file 251/5.

118. See Report of the Advisability of Completing the Shahpur Branch, by M. S. Leigh, Assistant Settlement Officer, Shahpur, n.d.; and Note by F. W. Schonemann, Superintending Engineer, Lower Jhelum Circle, on the Shahpur Branch Canal Project, 8 May 1914, Punjab PWD, Irrigation, #38 of 1914, Punjab Public Works Secretariat, Lahore. Schonemann's figures for variations in the opening and closing dates of irrigation on the government's Shahpur inundation canals suggest the great level of variation in the availability of early and late season supplies. Taking five-year averages over a twenty-year period, he found that the length of the irrigating season had varied from 135 days during one quinquennial period to

166 days in another. Of course, these figures concealed far larger variations from year to year and canal to canal.

119. H. E. Perkins, Comm. & Super., Rawalpindi to Sr. Sec. to Fin. Comm., 21 October 1884, Punjab BOR, file 251/5.

120. So closely aligned was the government with Malik Mubariz Khan on this issue that Mubariz Khan told Wilson he was willing to pay whatever legal expenses the government might incur in pushing the case through to a resolution.

121. See note by E. P. Henderson, Govt Advocate, n.d. (1896), p. 8, and Henderson to Sr. Sec. to Fin. Comm., 17 June 1896, Punjab BOR, file #171/36 (Partition of Shamilat Lands of Mauza Mangowal Khurd, Shahpur).

122. Col. J. E. Cracroft, Comm., Rawalpindi to G. W. Rivaz, Sec. to Fin. Comm., 12 October 1876, Punjab BOR, file 251/40. Tension between the requirements of grazing and of cultivation was evident from the very beginning in this case. In a note, the assistant conservator of forests observed that much of the tract proposed for irrigation, rakh Khushab, though perhaps suitable for cultivation, supported "immense herds of cattle" that "are sent to graze daily from all the surrounding villages. . . . The advisability of giving up the whole of this large tract for cultivation," he noted, is therefore "a matter which requires consideration."

123. The commissioner questioned the whole enterprise. In marginal rakhs such as that under consideration, he wrote, "the growth of forest and scrub is of paramount importance, while the extension of cultivation is a positive evil," a comment that provoked a simple marginal note from another official (probably Rivaz): "nonsense." Col. J. E. Cracroft, Comm., Rawalpindi to G. W. Rivaz, Sec. to Fin. Comm., 12 October 1876, Punjab BOR, file 251/40. Later correspondence in any case portrayed Sher Muhammad Khan's canal enterprise as among the least successful of those of the Tiwanas. Ultimately, the canal was amalgamated with a parallel canal (the Corbynwah) owned by the government, and, in 1891, Sher Muhammad Khan's canal disappeared.

124. Note by Lt.-Col. E. G. Wace, Second Fin. Comm., on the Assessment and Management of Private Canals in Shahpur, 26 June 1885, Punjab BOR, file 251/5.

125. H. C. Fanshawe, Offg. Jr. Sec. to Govt., Punjab to R. G. Thomson, Offg., Sr. Sec. to Fin. Comm., Punjab, 28 September 1885, Punjab Rev. & Agric., Irrigation, September 1885, A procs., #6-7 (Management of Canals in the Shahpur District and Proposed Legal Enactment for the Construction, Management and Control of Private Canals in the Punjab), Punjab BOR, file 251/5.

126. *Ibid.*

127. Concern for the prestige of these men at times outweighed a frank assessment of their role in the expansion of irrigation. "The owners" of the Shahpur canals, as one official wrote, regard the canals "as the foundations, which indeed they are, of their own prosperity and the badge of their superiority of dignity over their neighbours. . . . It would be a great pity . . . to shake the prestige of the leading men in (the district) for the sake of even a considerable extension of irrigation." Note by M. S. D. Butler, Deputy Commissioner, Shahpur, 19 July 1899, Rev. and Agric. (Land Revenue), October 1901, A procs., #24-28, NAI.

128. Opinion of E. D. Maclagan, Settlement Collector, Multan, 28 June 1899, Rev. & Agric. (Land Revenue), October 1901, A procs., #24-28, NAI.

129. Rev. & Agric. (Land Revenue), October 1901, A procs., #24-28, NAI.

CHAPTER 5. SCIENCE, THE STATE, AND THE ENVIRONMENT

1. Punjab Public Works Department, Irrigation Branch, *A Manual of Irrigation Practice* (Lahore: Government Printing, 1943), para. 3.50.
2. Prakash Tandon, *Punjabi Century, 1857–1947* (Berkeley: University of California Press, 1961), 50.
3. Among several important, earlier perennial canals in the province were the (Upper) Bari Doab and the Sirhind .
4. Aloys Michel has called the canals of this era a “second wave,” beginning in the 1880s, marked by a new focus on the application of irrigation water to state-controlled “waste-lands.” The notion that state irrigation projects should be directed toward Crown Wastes was, of course, not entirely new. But, as Michel notes, “none of the perennial schemes introduced into the Punjab up to 1882 involved any substantial extension of irrigation to new lands.” Michel, *Indus Rivers*, 74–76.
5. India Government, Public Works Dept., *Irrigation in India: Review for 1917–1918* (Simla: Government Printing, 1919), 45–47.
6. Gyan Prakash, *Another Reason: Science and the Imagination of Modern India* (Princeton: Princeton University Press, 1999), 160.
7. See Mital, *History of the Thomason College of Engineering*. For a brief discussion of Cooper’s Hill in its historical context, see Christopher V. Hill, *South Asia: An Environmental History* (Santa Barbara: ABC-CLIO, 2008), 119–21.
8. On the strong link of engineering education in India to the needs of the Public Works Department (hereafter PWD)—and the limits of Indianization in PWD hiring—see Arun Kumar, “Colonial Requirements and Engineering Education: The Public Works Department,” in *Technology and the Raj: Western Technology and Technical Transfers to India, 1700–1947*, ed. Roy MacLeod and Deepak Kumar (New Delhi: Sage, 1995).
9. In 1809, the East India Company had opened a military seminary at Addiscombe, and many prominent colonial irrigation engineers, most notably Sir Arthur Cotton, had come out of this context.
10. Sir Richard Temple, “Cooper’s Hill College of Engineering,” in his *Oriental Experience* (1883; repr., Delhi: Gian Publishing House, 1986), 304–11.
11. Punjab Public Works Department, *Manual of Irrigation Practice*, 3.50–3.52. The engineering problems with the Bari Doab and Sirhind canals, and the general doubts about canal construction that they raised in the 1870s, are discussed briefly in Michel, *Indus Rivers*, 60–61, 71–72.
12. Temple, “Cooper’s Hill College of Engineering,” 310.
13. Sir William Willcocks, *Sixty Years in the East* (Edinburgh: William Blackwood, 1935), 32.
14. Tandon, *Punjabi Century*, 29.
15. As C. A. Bayly has argued, the distinctive definition of “public,” as embodied in the phrase “public works,” was associated with a prominent legitimizing vision of state power in nineteenth-century Britain as “disinterested,” that is, non-venal and not self-interested. See C. A. Bayly, “Indian Ecumene and British Public, 1780–1880” (paper presented at the SSRC Conference, “Creating a Public: The European ‘Public Sphere’ and Its Alternatives Under Colonialism,” University of Chicago, October 7–10, 1993), 3.

16. T. R. J. Ward (Inspector-General of Irrigation in India, PWD, GOI), "Introduction," in *Glossary of Terms in Use on Punjab Canals*, ed. H. W. Nicholson (Simla: Government Printing, 1920), 1. Here, of course, the concern with "exact terminology" was also linked to the importance of measurement (and numbers) in defining the professional, apolitical self-image of engineering.

17. Robert Burton Buckley, *Facts, Figures, and Formulae for Irrigation Engineers* (London: E. and F. N. Spon, 1908), 124–25.

18. Herbert M. Wilson, *Manual of Irrigation Engineering*, 1st ed. (New York: John Wiley and Sons, 1893), 38. Wilson's textbook was intended for American engineers, yet it drew also on Indian experience.

19. M. Norton Wise and Crosbie Smith, "Work and Waste: Political Economy and Natural Philosophy in Nineteenth Century Britain," *History of Science* 27 (1989): 263–301, 391–449, and 28 (1990): 221–61. I would like to thank Mimi Kim for suggesting these sources. In the realm of scientific thinking, this shift was captured perhaps most prominently in the articulation at mid-century of the second law of thermodynamics—which postulated, through the concept of entropy, the fundamental notion of natural energy systems tending toward ever-increasing disorder.

20. H. W. Dickinson, *James Watt: Craftsman and Engineer* (Cambridge, Engl.: Cambridge University Press, 1936), 106. According to the *Oxford English Dictionary*, the term was "introduced" by Watt.

21. J. S. Beresford, "Memo on the Irrigation Duty of Water and the Principles on which Its Increase Depends," Aug. 1875, Punjab Public Works Department, Irrigation Branch, *Remodelling of Distributaries on Old Canals* (Punjab Irrigation Branch Papers, no. 10, 1905).

22. R. G. Kennedy, "Note on the Irrigation Duty of the Bari Doab Canal," April 1883 (Punjab Irrigation Branch Papers, no. 10, 1905).

23. Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge, Mass.: Harvard University Press, 1987), 57–58. Latour is here using the metaphor of water control to describe the structure of scientific argument. But his metaphor suggests how the model of nature as tending to dissipation defined even the work of the scientist, or engineer himself, in building and controlling a scientific case.

24. This did not mean that flow could necessarily be completely equalized over the year, as rabi supplies in the rivers were sometimes below the "full supply" design of a channel (based on available water during the kharif, or flood, season). To maintain full supply to distributaries during periods of low flow in main channels, distributary channels were thus sometimes run on a rotational basis. See Nicholson, *Glossary of Terms in Use on Punjab Canals*, 3–4. Nevertheless, the contrast with inundation canals, which had no head regulators, was dramatic.

25. Colonel S. L. Jacob (late of the Punjab Irrigation Department), "Paper on Irrigation and Famine Prevention in the Punjab," in *Punjab Minutes of Evidence*, Indian Irrigation Commission (Calcutta: Government Printing, 1902), 237. Nevertheless, much evidence was presented to the Irrigation Commission about ways to improve inundation canal irrigation.

26. Wilson, *Manual of Irrigation Engineering*, 193.

27. Kennedy drew on a long history of published work in hydraulics, much of it from the European continent. He made particular use of the hydraulic formulas of Wilhelm Kutter. But his influence lay in experimental adaptation of these to conditions in the

Bari Doab. From the construction of the Lower Chenab canal in the 1890s until well after 1947, Kennedy's theory of regime channels (modified by Lacey) guided major channel design in the Indus basin. This is not to say that all silt clearance on such channels was given up, but standard bureaucratic practice significantly changed. It was only in the 1960s that, in the Indus basin, the theory of regime channels began to be seriously questioned. For a good discussion of this, see Iqtidar H. Siddiqui, *Irrigation Canals: Planning, Design, Construction and Maintenance* (Islamabad: National Book Foundation, 1979), 93–163.

28. Remodeling itself became the subject of complex engineering rules. See Punjab Public Works Department, Irrigation Branch, *General Instructions for the Adjustment of Outlets and Preparation and Sanction of Remodelling Schemes* (Lahore: Government Printing, 1945).

29. Note by the Chief Engineer (C. D. Gee), 19 May 1914, Punjab PWD, Irrigation, file no. 78 of 1898, Punjab PWD Secretariat, Lahore.

30. For a general overview of the tightening of canal management in the United Provinces, including moves from open cuts to more controlled outlets, see Stone, *Canal Irrigation in British India*, 195–238.

31. K. R. Sharma, *Irrigation Engineering*, vol. 1 (Jullundur: India Printers, 1946), 341. Connected with the control of supply levels in channels was the development of distributary head regulators (which could also serve as silt excluders); see *ibid.*, 329–39.

32. The problem of developing modules that could gauge outlet deliveries in proportion to shifting canal levels proved extremely difficult. For a discussion of the development of various kinds of modules in the first half of the twentieth century, see Sharma, *Irrigation Engineering*, 340–60. The following paragraph is based on *ibid.*, 365–70.

33. This hinged on several factors, such as whether wells also existed as a source of irrigation water in the command area, or whether the spring level along a canal was such as to raise the specter of future waterlogging. Sharma recommended normal intensities of 75–80 percent (which was typical of those instituted in the early colonies), suggesting that 20–25 percent of the culturable land was projected as not being irrigated in any given year.

34. Learning such formulas was critical to the training of young engineering students; examples of hypothetical student exam questions of this sort can be found in a later textbook, S. K. Mazumder, *Irrigation Engineering* (New Delhi: Tata McGraw-Hill Publishing, 1983), 180.

35. Ward, "Introduction," 2.

36. Michael Lewis, "The Personal Equation: Political Economy and Social Technology on India's Canals, 1850–1930," *Modern Asian Studies* 41, no. 5 (2007): 967–94

37. Note by R. Egerton Purves, Superintending Engineer, Upper Jhelum Canal, 9 April 1913, Punjab PWD, Irrigation, #38 of 1913 ("Assessment of Occupiers Rates in Connection with the Module Question"), Punjab PWD Secretariat, Lahore.

38. Provincial irrigation departments continued to be organized into bureaucratic hierarchies headed by engineers. These departments were administered according to principles that had little to do with mathematical modeling—and so establishing effective control over lower-level irrigation employees remained an ongoing problem.

39. On the history of water pricing in the United Provinces, which showed tensions similar to those in Punjab, see Stone, *Canal Irrigation in British India*, 159–94.

40. Since calculations of duty helped to determine the distribution of water, they also came, in some cases, to be politicized. For an example of this, in connection with twentieth-century conflicts between Punjab and Sind, see chapter 6.

41. The commission was headed by Sir Colin Scott-Moncrieff, a military engineer who was trained at Addiscombe but had served for a time as an administrator at Roorkee, and who was predisposed to take a comprehensive view of the river basin as a framework for irrigation planning as a result of his previous experience in Egypt during the 1890s.

42. These were Jacob's two guiding principles for a new era of large-scale water development. Jacob, "Paper on Irrigation and Famine Prevention in the Punjab," 236–37.

43. Michel, *Indus Rivers*, 83–90. See also James Wilson (Settlement Commissioner, Punjab), "Note on the Means of Irrigation of the Lower Bari Doab," in *Punjab Minutes of Evidence*, Indian Irrigation Commission (Calcutta: Government Printing, 1902), 225–26, and Jacob, "Paper on Irrigation and Famine Prevention in the Punjab," 235–47. The plan was also shaped by the desire to reserve the bulk of water in the Sutlej for projects on the Sutlej's left bank, in which not only the Punjab but Bahawalpur and Bikaner states also had an interest.

44. Punjab PWD, Irrigation, #122 of 1914 ("Distributing the Supplies of the Rivers Jhelum, Chenab and Ravi Between the Five Canals"), Punjab PWD Secretariat, Lahore.

45. For discussions of the effects of these processes on Sind's canals, see Bombay PWD (Irrigation), no. 27 of 1906, vol. 259 of 1904–09, Maharashtra State Archives. For discussions on the deterioration of downstream flood-irrigated and inundation canal-irrigated villages as a result of the canal colonies in Punjab, see Punjab, Revenue and Agriculture, Irrigation, December 1900, procs. #36–40 ("Deterioration of Riverain Tracts Due to the Construction of Perennial Canals"), Punjab Archives, Lahore.

46. This pattern shaped settlement even on some areas of "waste" in eastern Punjab. As E. G. Wace noted, due to disorder there were—in certain districts such as Karnal, Rohtak, Hissar, and Sirsa—large areas of culturable land that had fallen out of cultivation. British revenue officials carved new estates out of these "wastes" and made them over (ultimately in proprietary right) to those who could bring them under cultivation. Note by Lt.-Col. E. G. Wace, Fin. Comm., 19 January 1888, Appendix to Punjab Revenue & Agriculture, General, May 1888, #6–8 ("Waste Land Rules"), Punjab Archives, Lahore.

47. This was a subject of considerable contention. The history of conflict over forest rakh policy, particularly (though not exclusively) in the western Himalaya, is a complex story, and one that at times disclosed the same tensions between "custom" and efficiency seen in irrigation policy. But it is well beyond the scope of this chapter. For a good discussion of the colonial conflicts over forest rakhs, see Vasant Saberwal, "Bureaucratic Agendas and Conservation Strategy in Himachal Pradesh: 1865–1994," *Indian Economic and Social History Review* 34, no. 4 (Dec. 1997): 465–84.

48. This was out of an estimated total of over 23,000 square miles of "uncultivated" *bar* land (which presumably would include village wastes). W.E. D'Arcy, "The Grazing Difficulty in the Punjab Forests," *The Indian Forester* 10, no. 1 (1884): 167.

49. Note by Lt.-Col. E. G. Wace, Fin. Comm., 19 January 1888, Appendix to Punjab Revenue & Agriculture, General, May 1888, #6–8 (Waste Land Rules), Punjab Archives, Lahore.

50. This ultimately produced the Sind Sagar Colonization Act of 1902. James Wilson, Settlement Commissioner, Punjab to Sr. Sec. to Fin. Comms., 11 October 1900, Punjab

Revenue & Agriculture, General, March 1901, #1–8 (Sind Sagar Doab Colonization Scheme), Punjab BOR, file 251/272.

51. Imran Ali provides an excellent overview of the various types of grants and their conditions and how this structure affected the colonies and defined the authority of the state. In the Chenab colony, “Peasant (*abadkar*)” grantees, who occupied the bulk of the land, were settled on long-term leases carrying many conditions. There were, however, other types of grantees, such as “yeoman (*sufedposh*)” and “capitalist (*rais*)” grantees, who could acquire proprietary rights after a qualifying period of five years. Some lands (though in very limited quantities) were also sold at auction with immediate property rights. Imran Ali, *The Punjab under Imperialism, 1885–1947* (Princeton: Princeton University Press, 1988), 19, 64–66. The balance of different types of grants changed somewhat in later colonies.

52. Note by Lt.-Col. E. G. Wace, second Fin. Comm., 24 August 1885; Wace to Sr. Sec. to Fin. Comms., 16 Feb. 1884, Punjab Revenue & Agric. General, April 1886 (Settlement of the Sidhnaï Lands in the Multan District), Punjab BOR, file 251/92. As J. B. Hutchinson noted, however, in many cases it was impossible for various reasons to draw village boundaries based on a single watercourse. But this should nevertheless be always aimed at, he stated, as the benefits were considerable, particularly in avoiding conflicts over watercourse repairs and turns for water. Maj. J. B. Hutchinson, DC Multan, “Report on the Settlement of the Land Irrigated by the Sidhnaï Canal,” 6 July 1888, Punjab BOR, file 251/92.

53. Frank Popham Young, “Report on the Colonization of . . . the Rachna Doab,” 6–9, Revenue, September 1897, A procs, #59–62, NAI. Encouraging the construction and maintenance of such field demarcations was of course a problem. J. B. Hutchinson argued that many colonists saw a positive interest in the regular demarcation of fields since it made them less reliant on the local *patwari* (village recordkeeper) for field measurements and they could “calculate for themselves if the crop measurements are correct.” But many resented government interference in such matters.

54. Ilyas Mohnem, *The Colony Manual* [revised edition of F. B. Wace, *Punjab Colony Manual*, rev. ed., 1933] (Lahore: Pakistan Civil and Criminal Law Publication, 1984), 41.

55. Dobson, *Final Report of the Chenab Colony Settlement* (Lahore: Government Printing, 1915), 11.

56. *Chenab Colony Gazetteer*, 50.

57. “Shades of our ancestors who gave every wood, field and hill in England its appropriate name!” Malcolm Lyall Darling, *The Punjab Peasant in Prosperity and Debt* (1925; 4th ed., Bombay: Oxford University Press, 1947), 133.

58. Mohnem, *Colony Manual*, 260. The previous quote, and a discussion of the evolution of the planning of village sites in the Chenab colony, are in B. H. Dobson, *Final Report of the Chenab Colony Settlement*, 10–11.

59. Though I would hesitate to push this too far, this mirrors in some ways Foucault’s ideas on the multiple facets of modern disciplinary practices. As Arun Agrawal puts it, much scholarship on modern forms of “governmentality,” influenced by Foucault, has stressed how “modern forms of power and regulation achieve their full effects not by forcing people toward state-mandated goals, but by turning them into accomplices. The very individuality that is supposed to be constrained by the exercise of power may actually be its effect.” Agrawal, *Environmentality*, 216–17.

60. Dobson, *Final Report of the Chenab Colony Settlement*, 10–11.

61. Mohnem, *Colony Manual*, 260–62.
62. Punjab Home, Medical and Sanitary, April 1912, A procs. #1–6, IOL.
63. Dobson, *Final Report of the Chenab Colony Settlement*, 10–11.
64. As the *Chenab Colony Gazetteer* declared, “[T]he canal made the Colony possible, but it was the railway which made it a success.” *Chenab Colony Gazetteer*, 118.
65. Darling, *Punjab Peasant in Prosperity and Debt*, 149.
66. *Chenab Colony Gazetteer*, 149.
67. *Ibid.*, 151.
68. Tandon, *Punjabi Century*, 161.
69. The ideal of settlement by village communities was also underscored by Wace: “Companies of agriculturists,” as he put it, would “settle in groups, and form cultivating villages similar to those of the districts from which they would have migrated.” Note by Lt.-Col. E. G. Wace, Second Fin. Comm., 24 August 1885, Punjab Rev. & Agric, General, April 1886, Punjab BOR 251/92. Aitchison contrasted these cohesive communities (with experience of village community and property) with the more “indolent or inefficient races” of southwest Punjab, many of whom continued to practice pastoralism. H. C. Fanshawe, Offg. Jr. Sec. to Govt. Punjab to Sr. Sec. to Fin. Comms., 27 October 1885, and R. G. Thomson, Offg. Jr. Sec. to Govt. Punjab to Sec. to GOI, Rev. & Agric., 3 November 1885, Punjab Rev. & Agric, General, April 1886, Punjab BOR 251/92. Since it was initially difficult to get central Punjab villagers to resettle to Multan, the Sidhnaï population was a mix. Of the land allotted to settlers by 1888, 60,000 acres had been given to local men from Multan and 85,000 to immigrants from other districts. Maj. J. B. Hutchinson, DC Multan, “Report on the Settlement of the Land Irrigated by the Sidhnaï Canal,” 6 July 1888, Punjab BOR, file 251/92.
70. Letter, Revenue Sec., Punjab, to Sec. to GOI, Rev. & Agric. Dept., 22 July 1891, quoted in Popham Young, “Report on the Colonization of . . . the Rachna Doab,” p. 10, Revenue, September 1897, A procs, #59–62, NAI. “Capitalist farming in general,” the government continued, “is not a system suitable to the Punjab.”
71. As the settlement officer for Amritsar wrote in describing his own priorities for selecting settlers, “[A]s far as possible, groups of men, all connected by common ties and ancestry, should be sent, each group being about enough to take up a whole *mauza* in the Bar.” “Memorandum describing the method of selection of colonists for the Chenab Canal from the Amritsar District” [1893?] by J. A. Grant, Settlement Officer, annexed to Popham Young, “Report on the Colonization of . . . the Rachna Doab,” p. 22, Revenue, September 1897, A procs, #59–62, NAI. Of course, this is not to suggest that this ideal was not compromised by other British political and administrative concerns. But, in the end, “peasant” grantees made up a little over 78 percent of the total in the Chenab colony. Dobson, *Final Report of the Chenab Colony Settlement*, 64.
72. Dobson, *Final Report of the Chenab Colony Settlement*, 4.
73. *Ibid.*, 36.
74. *Chenab Colony Gazetteer*, 41.
75. The British were well aware that certain forms of religion could be cast in direct opposition to structures of genealogical authority. This was reflected in some of C. L. Tupper’s comments on customary law. See, e.g., Tupper, *Punjab Customary Law*, I: 19.
76. Popham Young, “Report on the Colonization of . . . the Rachna Doab,” p. 23, Revenue, September 1897, A procs, #59–62, NAI.

77. The colonies brought many new opportunities for migrating kamins, who in many cases improved their economic position and gained new leverage within colony villages. As Dobson put it in 1915, the position of the colony kamins was then one of “substantial prosperity. Even outcast chuhras and chamars are frequently owners of several head of cattle, not to mention their partiality for the lesser orders of livestock. In the occasional unrest which disturbs village society, they easily hold their own by the familiar devices of boycott and combination.” Dobson, *Final Report of the Chenab Colony Settlement*, 82. This was written at a time of fairly high agricultural prices, and the position of kamins later worsened when prices fell. But their relative economic position was generally stronger in the colonies than it was elsewhere in the Punjab.

78. Dobson, *Final Report of the Chenab Colony Settlement*, 10–11, 74.

79. The exclusion of kamins from gaining regular allotments in colony villages was not only colonization policy but also followed from the terms of the Punjab Land Alienation Act of 1900, which barred those who were not members of “agricultural tribes,” including both nonagriculturists and kamins, from acquiring village land.

80. Ali, *Punjab under Imperialism*, 94.

81. As government instructions noted: “There will be little to record in many villages, but there is no reason for departing from the usual form.” Punjab BOR, file 251/144 (Chenab Canal. Preparation of a Record of Rights and Annual Papers).

82. *Report of the Colonies Committee, Punjab, 1907–8* (Lahore: Civil and Military Gazette Press, 1908), 23. Some officials recognized the irony in applying “customary law” to village communities that had been settled less than a decade or two. The courts too, at times, questioned the foundations for applying customary law in the colonies. But the assumption that colonists carried their customary law with them nevertheless became the dominant legal assumption.

83. Some very fragmentary evidence on possible improvements in women’s status in the colonies is given in Malcolm Lyall Darling, *Wisdom and Waste in the Punjab Village* (London: Oxford University Press, 1934), 20–21. On the ways that irrigation may improve many women’s relative economic position, see Pamela Stanbury, “Women and Water: Effects of Irrigation Development in a North Indian Village,” in *Sociology of Natural Resources in Pakistan and Adjoining Countries*, ed. Michael Dove and Carol Carpenter (Lahore: Vanguard, 1992), 372–99.

84. Islam, *Irrigation, Agriculture and the Raj: Punjab, 1887–1947*, 141.

85. The phrase begins Deva Singh’s 1930 monograph on the Chenab colony. Deva Singh, *A History of Colonization in the Rechna Doab* (Lahore: Government Printing, 1930), 1.

86. Darling, *Punjab Peasant in Prosperity and Debt*, 135, 117.

87. Dobson, *Final Report of the Chenab Colony Settlement*, 14.

88. As Thompson argues in his discussion of late eighteenth-century bread riots, popular resistance to new state policies (and to a new market-based morality) grew out of a popularly perceived “moral economy” linked to the past paternalist undertakings (and moral authority) of the state itself. Resistance was legitimized by the state’s failure to enforce the “rights” that the state itself had previously recognized (in this case, to a fair price for bread). E. P. Thompson, “The Moral Economy of the English Crowd in the 18th Century,” *Past and Present* (1971): 76–136.

89. Note, dated 31 May 1909, by W. B. Gordon, Chief Engineer, Irrigation, Punjab, on Complaints against the Canal Administration in the Districts of Multan, Muzaffargarh and

Dera Ghazi Khan (with Abstract of Petitions Submitted to the Chief Engineer), Punjab PWD, Irrigation, #412 of 1909, Punjab PWD Secretariat, Lahore. For an overview of inundation canal management during this period, see Punjab Irrigation Branch Papers, #6 (Muzaffargarh Canals), Punjab PWD Secretariat, Lahore, and G. W. Duthy, "Remodeling Inundation Canals in the Muzaffargarh District," *Minutes of the Proceedings of the Punjab Engineering Congress* 7 (1919): 39–48.

90. R. T. Clarke, DC Multan to Commissioner, Multan, 11 August 1908; Extract from Muzaffargarh District Revenue Report, 1906–7, Punjab PWD, Irrigation, #412 of 1909, Punjab PWD Secretariat, Lahore.

91. Officials suggested that petitioner awareness of these debates is what, at least in part, prompted the large number of petitions.

92. J. M. Dunnett, DC Muzaffargarh, to Commissioner, Multan, 28–29 June 1908, Punjab PWD, Irrigation, #412 of 1909, Punjab PWD Secretariat, Lahore.

93. W. R. H. Merk, Commissioner, Multan Division to Sr. Sec. to Fin. Comm., 16 Sept. 1908, Punjab PWD, Irrigation, #412 of 1909, Punjab PWD Secretariat, Lahore.

94. Note by C. D. Gee, 19 May 1914, Punjab PWD, Irrigation, #78 of 1898, Punjab PWD Secretariat, Lahore.

95. Note, 31 May 1909, W. B. Gordon, Chief Engineer, Irrigation, Punjab, PWD, Irrigation, #412 of 1909, Punjab PWD Secretariat, Lahore.

96. Report by E. S. Bellasis, Superintending Engineer, Derajat Circle, 5 May 1909, PWD, Irrigation, #412 of 1909, Punjab PWD Secretariat, Lahore.

97. This, too, provoked strong irrigator complaints, but it was also distasteful to engineers since it required ad hoc action and the mobilization of Canal Department subordinates to enforce.

98. Hira Singh, MLC, village Narli (Lahore district) to Sir Fazli Husain, 3 December 1927. The protection of rights during remodeling was also linked to the claims of "privilege" in access to water along particular canals. This was put perhaps most blatantly by Nawab Nisar Ali Qazilbash in a petition dealing with Irrigation Department plans to reduce the size of an outlet irrigating his lands on the Niaz Beg distributary outside Lahore. When informed by the canal engineer that his outlet would be reduced in accord with "mathematical calculations," he replied that his ancestors, who had received earlier British land grants, "did not render service to the British Government after mathematical calculations." Morally speaking, ancestral rights could not so easily be trumped by science. Petition of Nawab Nisar Ali Qazilbash to DC, Lahore, 5 October 1931, Punjab PWD, Irrigation, #45 of 1907, Punjab PWD Secretariat, Lahore. See also David Gilmartin, "Scientific Empire and Imperial Science: Colonialism and Irrigation Technology in the Indus Basin," *Journal of Asian Studies* 53, no. 4 (Nov. 1994): 1127–49.

99. From the very beginning, establishment of the haq went hand in hand with attempts at the fixation of outlets and with chakbandi operations. For a discussion of early (and problematic) attempts to fix the amount of water delivered to outlets on the Bari Doab canal, see note by Col. H. W. Gulliver, Chief Engineer, Irrigation, 26 March 1879, Punjab Rev., Agric. and Commerce, April 1879, #7, IOL.

100. J. M. Douie, Settlement Commissioner, to Sr. Sec. to Fin. Comm., Punjab, 7 June 1906, Punjab, Rev. & Agric. (Irrigation), #6–22, April 1907, in Punjab PWD, Irrigation, #101 of 1905 ("Over-irrigation on the Lower Chenab Canal"), Punjab PWD Secretariat, Lahore.

101. Punjab PWD, Irrigation, #74 of 1910 (Discontinuance of the Word “Haq” in Official Papers), Punjab PWD Secretariat, Lahore.

102. Dobson, *Final Report of the Chenab Colony Settlement*, glossary of vernacular terms, 2.

103. Barrier explains the complex relationship between rural and urban interests during the 1907 protests, particularly those relating to the activities of the Congress, whose strongest influence in Punjab was largely urban at this time, and the Arya Samaj, an important Hindu reform movement in this era. For an overview, see Barrier, “Punjab Politics and the Disturbances of 1907.”

104. Many cultivators had discovered, as one official put it, that “the weapon of the law” could be used “to resist the orders of the Colonization Officer.” C.L. Tupper, Minute, 1 March 1901, quoted in Norman Gerald Barrier, “Punjab Politics and the Disturbances of 1907” (Ph.D. diss., Duke University, 1966), 179.

105. Dobson, *Final Report of the Chenab Colony Settlement*, 12. This was portrayed, of course, as being for the ultimate good of the people. As the lieutenant-governor of the Punjab, Sir Charles Rivaz, observed in November 1906 after the introduction of the Colonization Bill, if there were unrest over the “new intervention into the lives of the people,” the colonists would realize soon enough that the bill was passed solely for the zamindars’ protection. Barrier, “Punjab Politics and the Disturbances of 1907,” 183–84.

106. The very promise of full state control over water supply in the colonies made the government a ready target for irrigators who could now blame inadequate or unpredictable supply directly on the state, whatever the normal vicissitudes of river and canal flow. The shifts in thinking that this entailed were captured by the later comments of Prakash Tandon, whose father had served as a colony engineer, quoted at the beginning of the chapter.

107. *Report of the Colonies Committee*, 126.

108. The history of waterlogging and its impact on irrigation management will be taken up in more detail in chapter 7.

109. Dobson, *Final Report of the Chenab Colony Settlement*, 13.

110. Barrier, “Punjab Politics and the Disturbances of 1907,” 187–88.

111. For background on the career of Ajit Singh, a Jat who was the uncle of the nationalist martyr Bhagat Singh, see *ibid.*, 200–208.

112. The linking of property and tribal honor was evident, e.g., in the argument that the lack of property rights had undermined the status of colonists in competing in the marriage markets of central Punjab.

113. Barrier, “Punjab Politics and the Disturbances of 1907,” 189.

114. An example was the former lieutenant-governor, Sir Dennis Fitzpatrick, who had been one of the architects of the Punjab Land Alienation Act of 1900. N. Gerald Barrier; “The Punjab Disturbances of 1907: The Response of the British Government in India to Agrarian Unrest,” *Modern Asian Studies* 1, no. 4 (1967): 353–83.

115. Ali, “Malign Growth?,” 121. This is an oversimplification of Ali’s argument, but it captures the gist. Others have viewed the protests differently. Richard Fox sees the protests as a manifestation of an incipient “lower-middle class consciousness” linking the Arya Samaj and rural property owners, a consciousness that was ultimately overwhelmed by the rise of communalism in the province. Richard Fox, *Lions of the Punjab: Culture in the Making* (Berkeley: University of California Press, 1985), 166. Indu Agnihotri, in contrast, stresses

the ecological pressures of the new canal systems on irrigator livelihoods, whatever the “modernizing” intentions of the British. See Indu Agnihotri, “Ecology, Land Use and Colonisation: The Canal Colonies of Punjab,” *Indian Economic and Social History Review* 33, no. 1 (1996): 37–58.

116. *Report of the Colonies Committee*, 126, 18, 125 (emphasis added). Note that the committee proposed that the enforcement of rules should eventually be based on complaints of waste coming from irrigators (and village panchayats) themselves, thus suggesting the gradual assimilation of irrigators to a larger engineering worldview.

117. Although the operation of custom had long been recognized in the colonies, some court decisions had, the committee noted, raised questions about the operation of customary law, as had new conditions proposed in the Colonization Bill. But, it argued, the “attachment of the great body of colonists to their customary law,” including the exclusion of daughters from landed inheritance, remained “unquestionable.” Even when it is a question of the succession of a daughter’s son versus a collateral, “those colonists who are not biased by personal circumstances almost unanimously declare for the succession of the collateral where the customary law is in favour of it.” Much of the discussion in the report focused on how customary succession could be protected even before proprietary rights were attained. *Report of the Colonies Committee*, 24–25.

118. *Report of the Colonies Committee*, 19.

119. Ali, *Punjab under Imperialism*, 109–57.

CHAPTER 6. THE RIVER BASIN AND PARTITION

1. A. M. R. Montagu’s preface to Michel, *Indus Rivers*, viii.
2. Saadat Hasan Manto, *Naked Voices: Stories and Sketches*, trans. Rakhshanda Jalil (New Delhi: Roli Books, 2008), 106.
3. Wittfogel, *Oriental Despotism*. Wittfogel provides a good, short summary of what he sees as the key features of the concept in Karl A. Wittfogel, “Chinese Society: A Historical Survey,” *Journal of Asian Studies* 16, no. 3 (May 1957): 344.
4. The period from 1919 to 1945 was, in the words of C. C. Inglis, one of “wonderful work,” particularly in the concept of “regime,” barrage construction, and in canal modeling. See comments of C. C. Inglis in discussion of paper on “Engineering Problems in Recent River Valley Projects in India” by K. L. Rao, in Institution of Civil Engineers, “Discussion: Engineering Problems,” 461.
5. *Report of the Food and Agriculture Commission* (Karachi: Government of Pakistan, Ministry of Food and Agriculture, 1960), 44–46.
6. Humaira Afzal, “Settling Disputes between Ethnoregional Groups in Young Democracies: Distributing the Indus Water in Pakistan” (Ph.D. diss., University of Michigan, 1995), 72.
7. J. G. Fife, *A Sketch of Irrigation of Sind with Proposal for Its Improvements* (Karachi: Kurrachee Sindian Press, 1855).
8. For a discussion of the background and politics of the Sukkur barrage, see Daniel Haines, *Building the Empire, Building the Nation: Development, Legitimacy, and Hydro-Politics in Sind, 1919–1969* (Karachi: Oxford University Press, 2014).

9. Michel, *Indus Rivers*, 93–97. This project also witnessed the most dramatic failure of a colonial irrigation structure, when, in the high floods of 1929, the central portion of the Islam barrage collapsed and had to be subsequently reconstructed.

10. *Report of a Committee of the Central Board of Irrigation on Distribution of the Waters of the Indus and Its Tributaries*, 1935, vol. 1 [Anderson Committee Report] (Lahore: Government Printing, 1950).

11. *Ibid.*, 22.

12. *Ibid.*, 24.

13. See, e.g., *ibid.*, 24: “Generally speaking, the acquiring of rights in water in perpetuity should not be allowed.”

14. This is not wholly true. Allocations originally sanctioned for each project, which were baselines from which the Anderson Committee sought to propose solutions to conflicts, were based in part on calculations of water duty in each project area, which were of course themselves defined by projections of water’s productive use in each area.

15. Anderson Committee Report, 24.

16. *Report of the Indus Commission, 1942* [Rau Commission Report] (Simla: Government Printing, 1942), 1: 1.

17. *Ibid.*, 10.

18. *Ibid.*, 20.

19. Thus, both Sind and the Punjab arranged for lawyers to appear before the Rau Commission. Niranjan D. Gulhati, *Indus Waters Treaty: An Exercise in International Mediation* (Bombay: Allied Publishers, 1973), 38–39. In the end, the principles of the commission’s judgment were embodied in a draft agreement between the chief engineers of Sind and the Punjab in 1945, but this was never given formal standing due to the coming of partition.

20. This provided engineers the moral wherewithal, as this textbook said, “to examine every problem impartially without fear or favour.” Mazumder, *Irrigation Engineering*, 283.

21. Quoted in Anderson Committee Report, 9.

22. Quoted in Afzal, “Settling Disputes between Ethnoregional Groups,” 81.

23. The quote is from Sir Frederick Gebbie. See Sind Government, *Note on the Rabi Duty Adopted for the Design of the Barrage Canals* (Karachi: Government Press, 1941), 3.

24. Punjabi settlers had been introduced much earlier on the Jamrao canal, and they were now viewed, as one official put it, as “inevitable if the Barrage [was] to be paid for.” For a larger discussion of this in the context of Punjabi settlement in Sind, see Sarah Ansari, “Punjabis in Sind—Identity and Power,” *International Journal of Punjab Studies* 2, no. 1 (Jan.–June 1995): 5–10. For a good discussion of these politics, see Haines, *Building the Empire, Building the Nation*.

25. H. J. Maynard, May 1923, Home General, 1925 B procs., 1925, file 176, Punjab Archives, Lahore.

26. In general, land sales were barred to those who were not members of these “tribes,” which included both village-level kamins and nonagriculturist moneylenders. In practice, of course, there were many exceptions (and nuances) to the ways that the Land Alienation Act actually operated. For some discussion, see M. Mufakharul Islam, “The Punjab Land Alienation Act and the Professional Moneylenders,” *Modern Asian Studies* 29, no. 2 (May 1995): 271–91.

27. Criticisms of the Unionists as a party of large landlords, with close administrative ties to the British, were thus rife both among Congress organizers and among more radical agrarian movements, who tended to speak more for the interests of tenants and smallholders. For discussions of radical rural politics in the Punjab in these years, see Bhagwan Josh, *Communist Movement in the Punjab, 1926–47* (Delhi: Anupama Publications, 1979), and Mridula Mukherjee, *Peasants in India's Non-Violent Revolution: Practice and Theory* (New Delhi: Sage Publications, 2004).

28. At times, Unionist leaders resisted irrigation policies that seemed to impinge on their local control. Even before the official formation of the party in 1923, a number of soon-to-be-Unionist supporters thus used their election to the Punjab Council in 1920 to criticize the government for reductions in the water supply to Multan's inundation canals attendant on the opening of planned new perennial canals associated with the Sutlej valley and Haveli projects. This followed a meeting of zamindars in Multan under the presidency of Muhammad Sadruddin Shah Gilani, *sajjada nishin* (hereditary custodian) of the shrine of Musa Pak Shahid in Multan, complaining about canal supply and administration after the 1920 Multan land revenue settlement. See Punjab BOR, file 251/3/27/2 (Appointment of Committee to Examine the Past and Present Water Supply of Multan Inundation Canals). But sometimes Unionist leaders were also champions of the ongoing extension of perennial canals and supporters of engineering projects, including with respect to conflicts over water with Sind. In the late 1930s, for example, Sir Chhotu Ram was a prominent advocate of accelerated construction of the planned Bhakra dam.

29. Note by J. D. Penny, 16 December 1925, Punjab PWD, Irrigation, #536 of 1922, Punjab Public Works Secretariat, Lahore. This had even shaped the distribution in the Lower Bari Doab colony of what the British called "landed gentry" grants of land.

30. Note by Herbert Emerson, 31 March 1928, on Negotiations with the Khakwanis, Punjab BOR, file 251/2/27/A-E. An account of the long history of negotiations with the Khakwanis with respect to compensation after the Privy Council's decision in the Hajiwah canal case is in Punjab PWD, Irrigation, #536 of 1922, Punjab Public Works Secretariat, Lahore.

31. Lt.-Col. F. Popham Young (Comm., Rawalpindi) to Private Canal Owners, Shahpur District, 10 October 1915, Punjab BOR, file 251/266.

32. Comments of O'Dwyer at a conference in Simla in August 1914 on the Shahpur canals. Note by F. C. Rose, Secretary to Govt., PWD, Irrigation, 25 August 1914, PWD, Irrigation, #38 of 1914, Punjab Public Works Secretariat, Lahore.

33. Note by H. J. Maynard on the Proposed Completion of the Shahpur Branch, PWD, Irrigation, #38 of 1914, Punjab Public Works Secretariat, Lahore. One proposal was to siphon the Shahpur branch under these inundation canals, but this raised technical concerns about waterlogging, a danger that played a major role in Shahpur branch discussions.

34. The west Punjab government moved quickly to take over these canals after independence, driven in part by politics relating to the fact that the most prominent of these canal owners, Sir Khizr Hyat Tiwana, the last Unionist premier, had opposed the Muslim League. Khizr Hyat Tiwana subsequently sued over the question of compensation for the canals. See PLD 1955 Lahore 88 (Malik Khizar Hayat Khan Tiwana, plaintiff v. Punjab Province, defendant).

35. Corruption within the framework of irrigation became the focus of increasing concern in these years (and a committee for its suppression was formed in the early 1920s). As a meeting

of executive engineers in 1939 on this issue concluded, some forms of corruption, such as the payment of money to avoid official fines, were virtually impossible to stop because the “honor” of local irrigators was at stake. Overall, they concluded, it was “well nigh impossible to achieve any success . . . unless the officials also get support from their superiors,” thus suggesting the intimate links between “corruption” and the larger structuring of the political system. Proceedings of the Meeting of Executive Engineers, Sirhind Canal Circle, Patiala, 4 September 1939. See Punjab PWD, Irrigation, file #131 of 1917, Punjab Public Works Secretariat, Lahore.

36. Note by John Maynard, Financial Comm., 5 April 1919, file linked to Punjab BOR, file 601/1/27/276.

37. The history of the incorporation of the Daultana canal into the Sutlej valley project, and the terms involved, are discussed in Punjab BOR, file 253/5/27/2 (“Acquisition of Ghulamwah Canal of Multan district”).

38. Bashir A. Malik, *Indus Waters Treaty in Retrospect* (Lahore: Brite Books, 2005), 31–34.

39. The problems of the Daultanas in controlling their own local managers had been earlier noted by British officials. The Daultana estate had been under a heavy debt load in the 1930s and 1940s, largely built up during the time of Ahmad Yar Khan Daultana. When Mumtaz Daultana returned from schooling in England and assumed control of the estate after his father’s death in 1940, he was, as one British official noted, “absolutely unacquainted with the business of the estate management” or of the fact that “for years the estate servants appear to have been robbing the late Khan Bahadur [Ahmad Yar Khan].” By the late 1940s, at the time of Malik’s presence, Daultana no doubt had a clearer idea of these local dynamics though he still exerted limited control from his normal residence in Lahore. See DC, Multan (Henderson) to Commissioner, Multan, 14 August 1940, Punjab BOR, file 601/1/27/276.

40. It was preeminently this bureaucratic aspect of the system that, as Imran Ali argues, in practice “retarded” the growth of nationalism in the Punjab. See Imran Ali, “The Punjab and the Retardation of Nationalism,” in *The Political Inheritance of Pakistan*, ed. D. A. Low (London: Macmillan, 1991), 29–52.

41. Oberoi, *Construction of Religious Boundaries*.

42. See, e.g., Lyallpur Deputy Commissioner’s files, file 14–232–119 (“Anti-Canal Agitation”). This correspondence concerns a “boycott” of canal water on July 15, 1938 (through the closing of outlets), to protest Irrigation Department policies with respect to a range of issues, including outlet remodeling. In the end, the protest led to the closing of almost 300 outlets in 145 different chaks. According to the executive engineer, these protest closures (though supported by the Congress) were primarily confined to Sikhs and “as far as I could see to the Akali section of the community” (report dated 18 July 1938). Interestingly, the Unionist premier, Sir Sikander, attacked the protesters of outlet remodeling for not recognizing, in effect, the interests of the larger community that were involved: “The Premier reiterated that it was impossible for the Government to give canal water to some people at the expense of others.” *Tribune* (Lahore), July 22, 1938. But for the Akalis, the solidarity of local communities (drawing on structures of biradari solidarity) was linked to a larger vision of common Sikh moral community juxtaposed against government power.

43. Darling, *Punjab Peasant in Prosperity and Debt*, 117.

44. This was related to the tension between the dominant Sikh Jats and other lower “tribes,” excluded by the Land Alienation Act from legitimate landholding even as they were ostensibly subsumed with a vision of Sikh “national” community.

45. This was an important debate among Punjab's Muslims in the 1920s and 1930s that hinged significantly on the contrasting inheritance rights for women under *shariat* and under customary law.

46. Iqbal Singh Sevea, *The Political Philosophy of Muhammad Iqbal: Islam and Nationalism in Late Colonial India* (Cambridge, Engl.: Cambridge University Press, 2012), 126–63.

47. Iqbal's moral rejection of genealogical identities as a foundation for life was reflected, e.g., in his poem "To a Panjab Peasant." D.J. Matthews, ed. and trans., *Iqbal: A Selection of the Urdu Verse* (London: School of Oriental and African Studies, 1993), 122–23.

48. Quoted in Naveeda Khan, *Muslim Becoming: Aspiration and Skepticism in Pakistan* (Durham, N.C.: Duke University Press, 2012), 75–76.

49. Willcocks's vision of nature's conquest, like that of most engineers, was not generally cast in religious terms, but his ideas were undergirded by strong (Christian) religious sentiments. See, e.g., Willcocks, *From the Garden of Eden*.

50. Sevea, *Political Philosophy of Muhammad Iqbal*, 109–13. In evoking a form of common purpose (and community) rooted in individual action upon the world, upon nature, Iqbal projected a vision of the "nation," or *millat*, as opposed to the territorial nation, or *qaum* (a term also used to translate the word "tribe" in "agricultural tribes"), that resonated with the larger vision of a community of individuals joined in the active understanding and conquest of nature (molding it to man's "own ends and purposes"). For a discussion of Iqbal's debate with Maulana Husain Ahmad Madani on the distinction between *millat* and *qaum*, see *ibid.*, 151–62.

51. Khan, *Muslim Becoming*, 55–90.

52. See the 1946 Muslim League election posters in David Gilmartin, trans., "Muslim League Appeals to the Voters of Punjab for Support of Pakistan," in *Islam in South Asia in Practice*, ed. Barbara Metcalf (Princeton: Princeton University Press, 2009), 409–23.

53. This was a vision embodied, e.g., in the 1944 Punjab Muslim League Manifesto, which was influenced by members of the Communist Party, many of whom had entered the league in the mid-1940s and attacked the inequalities of the colonial property regime. There were also a few radical voices among the ulama, who attacked the property order from a somewhat different direction. See Muhammad Qasim Zaman, "Socio-Economic Justice in Deobandi Thought," in *Muslim Voices*, ed. Usha Sanyal, David Gilmartin, and Sandria Freitag (Delhi: Yoda Press, 2013), 146–83. But the impact of this was limited, since the league's leadership reflected strong property interests.

54. See Gilmartin, *Civilization and Modernity*, 177–210. In some cases, this was linked to efforts to give biradaris reformist pedigrees through the publication of new "tribal" histories intended to establish genealogical links to the time of the Prophet. For some discussion, see *ibid.*, 43–51.

55. Of the total land area of the Indus basin, the remaining 8 percent was in Tibet and 6 percent in Afghanistan. "Indus River Basin," *Aquastat* (FAO Water Information Site), www.fao.org/nr/water/aquastat/basins/indus/index.stm. This represented, however, only 10 percent of India's land area and over 65 percent of that of Pakistan (and 95 percent of its irrigation).

56. "We have marked the land as engineers, if we have not improved it as architects," Radcliffe said. Quoted in Lucy P. Chester, *Borders and Conflict in South Asia: The Radcliffe Boundary Commission and the Partition of Punjab* (Manchester: Manchester University Press, 2009), 80–82.

57. *Ibid.*, 81. This is not to say, of course, that the local course of the partition line made no difference, for it influenced significantly the details of later water disputes (as we shall see). For some discussion of this, see Kazi S. Ahmad, "Canal Water Problem," *Oriental Geographer* 2 (1958): 31–46.

58. As Chester persuasively argues, British strategy throughout was to pin responsibility on Indians for the decisions surrounding partition, even though the British themselves had controlled the boundary-drawing process. Radcliffe's vision of partition's effects on the irrigation system could be seen as a case in point. For the larger argument, see Chester, *Borders and Conflict in South Asia*, 25.

59. Gulhati, *Indus Waters Treaty*, 56–57.

60. Michel, *Indus Rivers*, 196.

61. Iqtidar H. Siddiqui, *Hydropolitics and Water Wars in South Asia* (Lahore: Vanguard Books, 2010), 53.

62. Gulhati, *Indus Waters Treaty*, 64n.

63. As Nehru noted, the Congress in east Punjab was split into two irreconcilably hostile factions, and, as result, "the Akali Sikhs are presumably masters of the situation." Sarvepalli Gopal, ed., *Selected Works of Jawaharlal Nehru* (New Delhi: Jawaharlal Nehru Memorial Fund, 1987–2000), 6: 45–57.

64. Michel, *Indus Rivers*, 205.

65. Gopal, *Selected Works of Jawaharlal Nehru*, 6: 61–62. Interestingly, it was the Pakistanis who were in some ways most interested in pinning the responsibility on the central Indian government, for such responsibility offered them a mirrored reflection of the authority they sought to vest in the central Pakistani state in such water matters after partition. The *Pakistan Times* thus made clear that, in its view, "the Government of India is not exonerated by its expression of inability to intervene in a matter that lies with the jurisdiction of one of its provinces." It was an *international* dispute and needed to be treated that way. "Canal Water" (editorial), *Pakistan Times*, Apr. 28, 1948.

66. Kathleen D. Morrison, "Dharmic Projects, Imperial Reservoirs, and New Temples of India: An Historical Perspective on Dams in India," *Conservation and Society* 8 (2010): 182–95. For analysis of this, see also Daniel Klingensmith, "One Valley and a Thousand": *Dams, Nationalism, and Development* (New Delhi: Oxford University Press, 2007), 213.

67. The way partition had changed the downstream calculus with respect to the Bhakra project is explained by Michel: "The pre-Partition Punjab would hardly have been allowed to proceed with the Bhakra project without paying to Sind at least some of the costs of one or two new barrages (at Gudu and Kotri-Hyderabad) on the lower Indus. Pre-Partition Punjab would have been subject to limitations on the size of Bhakra and on its operation—limitations reflecting the requirements not only of Sind but of the Sutlej Valley Project below Ferozepore. After Partition, East Punjab was relieved of any of these requirements." Michel, *Indus Rivers*, 200.

68. Nehru, "The Temples of New India," speech given while inaugurating the Bhakra-Nangal canal system at Nangal, July 8, 1954, in Gopal, *Selected Works of Jawaharlal Nehru*, 26: 130–43.

69. See Klingensmith's chapter on "Nationalist Engineering," in his "One Valley and a Thousand," 211–53.

70. Gulhati, *Indus Waters Treaty*, 59.

71. Klingensmith, "One Valley and a Thousand," 246–50.
72. Kanwar Sain, *Reminiscences of an Engineer* (New Delhi: Young Asia Publications, 1978), 90–124.
73. *Ibid.*, 128–29. Interestingly, in appealing for the central Indian government to play the critical role in this, Sain decried the difficulties created by "narrow provincialism" that would have to be overcome.
74. Gulhati, *Indus Waters Treaty*, 359–61 (emphasis added). Reflecting the national imperatives involved, Gulhati made it clear that plans for the Rajasthan canal, however embedded in ideas of civilizational progress, were also critical to India's pragmatic negotiating strategies, providing the "raison d'être of withdrawing Eastern Rivers water from Pakistan."
75. Nida Rehman, "From Artifact to Site: Understanding the Canal in the City of Gardens" (master's thesis, Massachusetts Institute of Technology, 2009).
76. "East Punjab Water Blockade Lifted," *Pakistan Times*, May 6, 1948.
77. "Fruits of Folly" (editorial), *Pakistan Times*, May 6, 1948.
78. Michel, *Indus Rivers*, 202.
79. Malik, *Indus Waters Treaty in Retrospect*, 104.
80. The Harike barrage was ultimately opened in 1953, thus limiting India's reliance on the now politically uncertain Ferozepore barrage. A Ferozepore feeder canal was also constructed to supply water to the Bikaner canal from Harike independently of the supply at Ferozepore.
81. *Pakistan Times*, July 11, 1948. In fact, the BRBD link from the Upper Chenab to the Ravi was not finished until 1956, and the canal was not extended southward to the Divalpur canal until 1958.
82. Malik, *Indus Waters Treaty in Retrospect*, 104.
83. *Ibid.*, 105–7.
84. *Pakistan Times*, May 19, 1948. According to one report, the workers were paid twelve to fourteen annas a day plus rations, though, according to other reports, many were "volunteers" who received only rations.
85. *Pakistan Times*, July 9, 1948.
86. *Pakistan Times*, June 6, 1948.
87. At the root of this was a bitter factional rivalry between the west Punjab premier, Iftikhar Husain Mamdot, and Mumtaz Daultana.
88. This prompted Pakistan to launch other projects also in the early 1950s to deal with the potential loss of Ravi and Sutlej flows, including a new Marala-Ravi link from the Chenab to the Ravi and a new Balloki-Suleimanki link to transfer water from the Ravi to the Sutlej valley project canals.
89. Speech at Jallo (Lahore district). Shaukat resigned from the government shortly after this. *Pakistan Times*, May 19, 1948. For another account, see Sirdar Shaukat Hyat-Khan, *The Nation that Lost Its Soul* (Lahore: Jang Publishers, 1995), 203–5.
90. For an extensive discussion of the considerable influence of the Tennessee Valley Authority model in Indian thinking, see Klingensmith, "One Valley and a Thousand." See also D'Souza, *Drowned and Dammed*.
91. David Lilienthal, "Science and the Spirit of Man," *Bulletin of the Atomic Scientists* 5, no. 4 (Apr. 1949): 99–100.

92. David Lilienthal, "Another Korea in the Making?" *Collier's*, Aug. 4, 1951.
93. *Ibid.*, 58.
94. Neda A. Zawahiri, "Third Party Mediation of International River Disputes: Lessons from the Indus River," *International Negotiation* 14, no. 2 (2009): 293. The quoted phrase was used by Nehru to reproach Bhimsen Sachar, then Punjab's chief minister, for manipulating water flows. The manipulation of water flows, "bad enough at any time," Nehru declared, was "much worse when a third party like the International Bank is concerned." Nehru to Bhimsen Sachar, Mar. 18, 1953, in Gopal, *Selected Works of Jawaharlal Nehru*, 21: 508–9.
95. At the time of the 1952 general elections in India, Nehru had castigated Punjabis, Sikhs, and Hindus alike for the continuing communalization of their politics after partition (which the horrific events of 1947, he implied, ought to have made them think better of). When those responsible for the creation of Pakistan left, Nehru said, "we thought that poison of communalism had gone too. Unfortunately they left that poison behind." Nehru's election speech at Ludhiana, Sept. 30, 1951, in Gopal, *Selected Works of Jawaharlal Nehru*, 16, pt. 2: 92–93.
96. This was in response to reports on India's activities in constructing the Harike barrage and the Bhakra dam. The people of Punjab, Daultana continued, would never accept "a situation of death by starvation" by allowing India to again cut off their water. Quoted in Gulhati, *Indus Waters Treaty*, 114. Daultana's appeals on this paralleled his more notorious manipulation of an emotive commitment to Islam to gain leverage against the center during the anti-Ahmadi disturbances in Lahore at around this same time. See *Report of the Court of Inquiry Constituted under Punjab Act II of 1954 to Enquire into the Punjab Disturbances of 1953* [Munir Report] (Lahore: Government Printing, 1954). Daultana's actual political base as chief minister of West Punjab was rooted primarily, as we have seen, in structures of landholding, biradari, and patronage—and manipulation of the local bureaucracy—as the 1951 provincial elections in Punjab had demonstrated. For a good discussion of this and of Daultana's role in these elections, see Tahir Kamran, "Early Phase of Electoral Politics in Pakistan: 1950s," *South Asian Studies* 24, no. 2 (July–Dec. 2009): 265–66. The type of local politics that Daultana patronized (in this case relating to his allies, the Qureshi family, in Sargodha district) was made public in A. M. Khan Leghari, *Report on the Sargodha District Board Elections, 1952–1953* (Lahore: Superintendent, Government Printing, Punjab, 1955).
97. See Nehru to Eugene R. Black, Sept. 23, 1951, and Nehru to B. K. Nehru, Sept. 22, 1951, in Gopal, *Selected Works of Jawaharlal Nehru*, 16, pt. 2: 368–72.
98. Embassy of Pakistan (U.S.), *Pakistan: The Struggle for Irrigation Water—and Existence* (Washington, D.C.: Embassy of Pakistan, 1953).
99. World Bank Press Release, Feb. 5, 1954, quoted in Michel, *Indus Rivers*, 235–36.
100. Quoted in Gulhati, *Indus Waters Treaty*, 136–37. For additional discussion, see Michel, *The Indus Rivers*, 235–36.

CHAPTER 7. THE INDUS WATERS TREATY AND ITS AFTERLIVES

1. Syed S. Kirmani, "Water, Peace and Conflict Management: The Experience of the Indus and Mekong River Basins," *Water International* 15, no. 4 (1990): 202.
2. This is not to say that there was no framework at all for ongoing consultation under the treaty, for a permanent Indus Commission was also set up to monitor the agreement

and deal with disputes, particularly since some limited uses of the western rivers by India were allowed so long as they did not diminish the flow into Pakistan. But this hardly impinged on the treaty's central logic.

3. The shares were: Rajasthan, 8 million acre-feet (MAF); Punjab/PEPSU, 7.2 MAF; and Kashmir, 0.65 MAF. As Pakistan had not officially accepted the bank's plan at this point, India shortly thereafter formally renounced the Barcelona Convention on international rivers, which it had signed in the 1920s, whose terms would have precluded this action without Pakistan's approval. See Michel, *Indus Rivers*, 319.

4. For a discussion of this program of development, see *ibid.*, 316–40, 364–83.

5. James L. Wescoat, Jr., "The Historical Geography of Indus Basin Management: A Long-Term Perspective, 1500–2000," in *The Indus River: Biodiversity, Resources, Humankind*, ed. Azra Meadows and P. S. Meadows (Karachi: Oxford University Press, 1999), 424.

6. For some discussion of Punjab's long-running complaints about the 1955 agreement, see Vijepal Singh Mann, *Troubled Waters of Punjab* (New Delhi: Allied Publishers, 2003), 17–23.

7. The central government was given the responsibility for the "regulation and development of inter-state rivers and river valleys" to the extent that parliament made provision for this in the public interest. Mahesh Chandra Chaturvedi, *India's Waters: Environment, Economy, and Development* (Boca Raton, Fla.: CRC Press, 2011), 176.

8. The center's 1976 water award led in turn to a series of court cases contesting the award, which were punctuated in the succeeding years by further negotiated, but ultimately contested, agreements. In 1981, an agreement among the states was forged and counter-signed by the prime minister, but this was later repudiated by the Punjab. Later, under the terms of the Rajiv-Longowal Accord of 1985, a Ravi-Beas Tribunal (Eradi Tribunal) was constituted in 1985 and issued an award in 1987. But its award was never fully accepted by the Punjab. For a brief overview, see Santosh Kumar Garg, *International and Interstate River Water Disputes* (New Delhi: Laxmi Publications, 1999), 54–62.

9. Some Sikhs claimed that the 1955 agreement had been forced on them under duress. See Gurdev Singh, *Scramble for Punjab Waters* (Chandigarh: Institute of Sikh Studies, 2004), 52.

10. For a discussion of patterns of increased groundwater pumping and depletion by 2002, which have only worsened since that time, see Gian Singh, Harminder Singh, and Surender Singh, *Groundwater Development in Punjab: Alternative Perspective and Policy Issues* (Patiala: 21st Century Publication, 2003).

11. For a discussion of this, see Bharat Bhushan, "The Origins of the Rebellion in the Punjab," *Capital and Class* 8, no. 5 (1985): 5–13.

12. This was in response to a Supreme Court judgment in 2002 that had ordered the Punjab to complete the canal. Some even began to argue that the Punjab should be paid royalties for water flowing to other states, just as the British state had in some cases taken royalties before partition from princely states or private canal owners. *The Tribune*, online edition, September 5, 2009 (<http://www.tribuneindia.com/2009/20090905/punjab.htm>).

13. Singh, *Scramble for Punjab Waters*, 22.

14. *Ibid.*, 57.

15. Michel, *Indus Rivers*, 270.

16. *Ibid.*, 254.

17. Critiques of the treaty's provisions were dampened in Pakistan by Ayub Khan's martial law regime, but the government's acceptance of the loss of water in return for foreign aid subsequently came in for its share of internal critique. A good example was Fatima Jinnah's criticism when she challenged Ayub in 1964–65: "Mr. Ayub Khan said that he did get Rs. 900 crore for it [the treaty]," she noted in a press statement. "I ask him is that adequate price for losing permanently the water for all times?" Quoted by Malik, *Indus Waters Treaty in Retrospect*, 153.

18. Wescoat, "Historical Geography of Indus Basin Management," 424. WAPDA also came to depend significantly on foreign consultants; by 1961, it had "the services of 28 foreign consulting firms," including the large American firms of Tipton & Kalmbach and Harza Engineering and the British firms Hunting Technical Services and Sir M. McDonald and Partners. See Edwin Bock and Albert Gorvine, *A Scientific Panel in Foreign Affairs: The Revelle Report* (Syracuse, N.Y.: Inter-University Case Program, 1982), 5. Such foreign input helped, as Daanish Mustafa has put it, to make the Indus basin "a veritable laboratory for international and national research" in water matters. Daanish Mustafa, "Social Construction of Hydropolitics: The Geographical Scales of Water and Security in the Indus Basin," *Geographical Review* 97, no. 4 (Oct. 2007): 484.

19. Muhammad Ayub Khan, *Friends Not Masters: A Political Autobiography* (London: Oxford University Press, 1967), 187.

20. See Michel, *Indus Rivers*, 271.

21. See Daniel Haines, "Concrete 'Progress': Irrigation, Development and Modernity in Mid-twentieth Century Sind," *Modern Asian Studies*, 45 (Jan. 2011): 179–200.

22. The World Bank looked to the unratified 1945 Sind-Punjab draft engineering agreement as a framework for this even during the era of "one unit," but it noted that its procedures needed to be "brought up to date to take into account the following new factors which were not foreseen in the Draft agreement: (i) public tubewell contributions; (ii) the IBP works; (iii) main river storage in addition to IBP works; (iv) changes in designed discharges of canals." Pieter Lieftinck, A. Robert Sadove, and Thomas C. Creyke, *Water and Power Resources of West Pakistan: A Study in Sector Planning* (Baltimore, Md.: Johns Hopkins University Press, 1969) II: 162. These were, of course, rather large "new factors."

23. Under all these commissions, provinces were essentially treated, in the language of the pre-partition Rau Commission, "as if they were a single community undivided by political or administrative frontiers," their needs defined by technical language. See Abrar Kazi, "Analysis of Water Accords, 1935–1991," in *The Politics of Managing Water*, ed Kaiser Bengali (Karachi: Oxford University Press, 2003), 160–69.

24. Javaid R. Laghari, "The Kalabagh Dam and Loss of Waters to Sindh," *Sindh Quarterly* 14, no. 4 (1986): 29.

25. Hasan Mansoor, "Water Wars: Sindh's Struggle for Control of the Indus," *Himal* 15, no. 7 (July 2002): 32.

26. Rasul Bux Palijo, *Sindh-Punjab Water Dispute, 1859–2003* (Hyderabad, Sindh: Center for Peace and Human Development, 2003), 64, <http://www.scribd.com/panhwar/d/38737185-Sindh-Punjab-Water-Dispute-1859-2003-By-RASUL-BUX-PALIJO>.

27. This agreement was forged during a time of heightened Sindi influence under the central Bhutto government. Laghari, "Kalabagh Dam and Loss of Waters to Sindh," 26–27.

28. Quoted in Afzal, "Settling Disputes between Ethnoregional Groups," 155.

29. Muhammad Hanif Ramay, *Punjab ka Muqaddimah* (Lahore: Jang Publishers, 1985), 149. Ramay is here mobilizing the language (“after every Karbala Islam lives”) of a pre-partition poem by Muhammad Ali Jauhar.

30. For further development of such evocations of panjabiyat, see David Gilmartin, “Environmental History, *Biradari*, and the Making of Pakistani Punjab,” in *Punjab Reconsidered: History, Culture and Practice*, ed. Anshu Malhotra and Farina Mir (New Delhi: Oxford University Press, 2012), 310–14.

31. Afzal, “Settling Disputes between Ethnoregional Groups,” 156. It was the army that intervened to open the CJL in 1985.

32. Mustafa, “Social Construction of Hydropolitics,” 493–94. Mustafa is specifically referring here to arguments on the Kalabagh dam.

33. This problem has been partly addressed by the decision to build another dam on the Indus, the Bhasha dam, upstream from Tarbela in Gilgit-Baltistan.

34. For a representative critique of the dam, couched in the international language of “sustainable development,” see Shaheen Rafi Khan, “The Case against Kalabagh Dam,” in Bengali, *Politics of Managing Water*, 174–79. See also Abrar Kazi, “Kalabagh Dam: Varying Points of View,” in Bengali, *Politics of Managing Water*, 182–83.

35. Javaid R. Laghari, “Environmental Concerns: Kalabagh Dam and Sindh-Punjab Water Dispute,” *Journal of Asian and African Affairs* 2, no. 2 (Dec. 1990): 190.

36. While noting the critical potential importance of the 1991 Water Accord, two water experts observed in 2006 that the Indus River System Authority functioned “more as a sounding box for the airing of ancient complaints about the fairness of the formula, and of contemporary mistrust about actual abstractions,” than as an effective arbiter of water allocations. The continuing problem of the politicization of technical data was reflected in their suggestion that the system still needed an independent “water auditor” responsible simply for measurements to make the system’s flows and entitlements transparent. See John Briscoe and Usman Qamar, *Pakistan’s Water Economy: Running Dry* (Karachi: Oxford University Press; Islamabad: The World Bank, 2006), 82.

37. For a review of these meetings in the years up to 1946, see Punjab Government, *Proceedings of the Waterlogging Conference, 1946* (Lahore: Government Printing, 1947), 1–3. For a detailed overview of these developments and of the history of thinking on waterlogging and salinity in the Indus basin, see *History of Irrigation in Indus Basin* (New Delhi: Central Board of Irrigation and Power, 1992), 50–52, 88–110.

38. See *Report of the Sub-Committee of the Central Board of Irrigation Appointed to Enquire into the Question of Waterlogging in Sind* (Simla: Central Board of Irrigation, 1936), 1–19.

39. Although the Anderson Committee in 1935 had laid out a variety of factors that caused waterlogging, they concluded that “it is impossible to lay down any hard and fast rules relating to those factors, and every case must be considered on its merits.” This was hardly an approach that facilitated the problem’s effective incorporation into a larger engineering model. Anderson Committee Report, 24.

40. The quotation is from the *Report of the Food and Agriculture Commission*, 44–46. See also B. L. C. Johnson, *Pakistan* (London: Heinemann, 1979), 110.

41. Anderson Committee Report, 24.

42. It was in this light that in 1946 the Punjab governor, Sir Evan Jenkins, tried to ground the loss of irrigated land due to waterlogging and salinity in the same terms used to assess

the benefits of new projects. With a projection in that year of the total quantity of “deteriorated” land in Punjab as two million acres, Jenkins noted that “if it were a question of providing fresh irrigation facilities for 2 million acres, there would be no hesitation in undertaking such a scheme, but now they were faced with the problem of protecting their old revenue, and that they must do everything possible to prevent this deterioration.” He pointed out “that they had not been careful in that respect in the last 25 years.” Punjab Government, *Proceedings of the Waterlogging Conference*, 5.

43. This is not to say that engineers had not gained increasing knowledge and experimented with many useful expedients. But no expedient had been developed on whose value engineers agreed. A prominent Punjab engineer, H. W. Nicholson, had recommended after a tour of the United States in 1927 that tubewells be widely installed as an anti-waterlogging measure, thus prefiguring the Salinity Control and Reclamation Project (SCARP) programs that began after partition. For various reasons, however, including expense and uncertainty about its value, little serious headway was made on this idea before 1947. See *History of Irrigation in Indus Basin*.

44. Quoted in *History of Irrigation in Indus Basin*, 52.

45. See Teclaff, “Evolution of the River Basin Concept,” 372–74. Increasing Pakistani reliance on foreign experts after 1947 was in part a response to the exodus of British and Hindu engineers and scientists that came with partition. See Khalid Ahmad, “We Were Swept Away in a Flood of Foreign Expertise,” in Bengali, *Politics of Managing Water*, 86–87.

46. On SCARP-I, see Glenn T. Malmberg, *Reclamation by Tubewell Drainage in Rechna Doab and Adjacent Areas, Punjab Region, Pakistan*, Geological Survey Water-Supply Paper, no. 1608-O, prepared in cooperation with the West Pakistan WAPDA, under the auspices of the USAID (Washington, D.C.: Government Printing Office, 1975), 3–5.

47. Quoted in Bock and Gorvine, *Scientific Panel in Foreign Affairs*, 6.

48. Quoted from the WAPDA plan in *ibid.*, 8.

49. Quoted in *ibid.*, 18.

50. *Ibid.*, 15. In a subsequent statement capturing both the optimism and condescension of systems theory, Wiesner was quoted in a *New Yorker* profile as saying: “If all goes well, Pakistan, which has the world’s fifth largest population, may be a modern country by 1980.” *New Yorker*, January 26, 1963, p. 62. Thanks to Ross Bassett for calling my attention to this source.

51. Bock and Gorvine, *Scientific Panel in Foreign Affairs*, 41–42. Efforts were made to interpret groundwater flows using systemic models from electrical engineering; see, e.g., M. J. Mundorff, G. D. Bennett, and Masood Ahmad, *Electric Analog Studies of Flow to Wells in the Punjab Aquifer of West Pakistan*, Geological Survey Water-Supply Paper, no. 1608-N, prepared in cooperation with the West Pakistan WAPDA, under the auspices of the USAID (Washington, D.C.: Government Printing Office, 1972). Computer modeling at this time was, of course, rudimentary as compared with what came later.

52. Quoted in Bock and Gorvine, *Scientific Panel in Foreign Affairs*, 18.

53. Frank van Steenberg and William Oliemans, “A Review of Policies in Groundwater Management in Pakistan, 1950–2000,” *Water Policy* 4 (2002): 326.

54. As a World Bank report noted in 1966, roughly 20 percent of the groundwater in canal areas of the Punjab and Bahawalpur was thought to be saline, whereas in the Lower Indus Region (Sind) the figure was 75 percent. World Bank, *Programme for the Development*

of *Irrigation and Agriculture in West Pakistan* (London: International Bank for Reconstruction and Development, 1966), vol. 8, annexure 11, p. 21.

55. Van Steenberg and Oliemans, "Review of Policies in Groundwater Management in Pakistan," 326–27.

56. D. W. Greenman, W. V. Swarzenski, and G. D. Bennett, *Ground-Water Hydrology of the Punjab, West Pakistan, with Emphasis on Problems Caused by Canal Irrigation*, Geological Survey Water-Supply Paper, no. 1608-H, prepared in cooperation with the West Pakistan WAPDA, under the auspices of the USAID (Washington, D.C.: Government Printing Office, 1967), 60–61.

57. World Bank, *Programme for the Development of Irrigation and Agriculture in West Pakistan*, vol. 8, annexure 11, p. 18.

58. See World Bank, Staff Appraisal Report, "Pakistan, Punjab Private Sector Groundwater Development Project" (June 13, 1996), 5; Briscoe and Qamar, *Pakistan's Water Economy*, 16. By 2006, there were 600,000 private tubewells.

59. Briscoe and Qamar, *Pakistan's Water Economy*, 16.

60. With respect to waterlogging, as Briscoe and Qamar noted in 2006, though the problem was hardly "beaten (nor will it ever be)," the problem could by then be said to be "controlled and managed to a degree no one foresaw fifty years ago," largely due to the spread of private tubewells. Briscoe and Qamar, *Pakistan's Water Economy*, xiv. Waterlogging has remained, of course, a significant concern in some areas.

61. By the first decade of the twenty-first century, heavy private tubewell pumping had begun in some areas (particularly, but not exclusively, in *barani* or rain-fed tracts) to draw down water tables through unsustainable water mining and in ways that suggested the need for new forms of groundwater management. See Briscoe and Qamar, *Pakistan's Water Economy*, 40–43. Such problems became particularly acute in Baluchistan. For an overview, see also A. S. Qureshi, P. G. McCornick, M. Qadir, and Z. Aslam, "Managing Salinity and Waterlogging in the Indus Basin of Pakistan," *Agricultural Water Management* 95 (2008): 1–10.

62. Briscoe and Qamar, *Pakistan's Water Economy*, 108.

63. Computer-based modeling had intensified since it first appeared in Indus basin science in the early 1960s. The World Bank's Development Research Center, in collaboration with WAPDA, began in 1976 to develop a "large-scale linear programming model of Pakistan's irrigated agriculture," which came to be called the "Indus Basin Model." This was revised in the late 1980s, recognizing "the inter-connectedness of virtually the entire irrigation system," including the connections of surface flow and groundwater. The "Indus Basin Model Revised" was transferred to computers in Pakistan and was used for planning purposes in the 1990s. Masood Ahmad and Gary P. Kutcher, *Irrigation Planning with Environmental Considerations: A Case Study of Pakistan's Indus Basin*, World Bank Technical Paper, no. 166 (Washington, D.C.: World Bank, 1992), 7–8. See also John H. Duloy and Gerald T. O'Mara, *Issues of Efficiency and Interdependence in Water Resource Investments: Lessons from the Indus Basin of Pakistan*, World Bank Staff Working Paper, no. 665 (Washington, D.C.: World Bank, 1984).

64. Ruth Meinzen-Dick, "Public, Private and Shared Water: Groundwater Markets and Groundwater Access in Pakistan," paper presented at the International Association for the Study of Common Property Meeting, Berkeley, June 1996, p. 2.

65. General unwillingness to intervene meant that warashikni cases were often taken directly to the courts, as a review in the late 1930s revealed. But a conviction rate (based on the figures for 1938) that was only 3.8 percent of the cases filed suggested that there was often little external redress for warabandi violations in that direction. Although some officials worried that “we should not overlook any means of eradicating so fruitful a source of riots and feuds in villages, as is provided by shortcomings in warabandi organization,” enforcement remained limited. Punjab Board of Revenue, 251/43/00/13. One of the consequences of this, as D. J. Bandaragoda and Saeed ur Rehman found much later, in the 1990s, was that irrigators often developed their own “agreed” warabandis, often quite different from official warabandi turns, which operated independently of the intervention of engineers, reflecting the realities both of uncertain water supplies and of local community power structures. See D. J. Bandaragoda and Saeed ur Rehman, *Warabandi in Pakistan’s Canal Irrigation System: Widening Gap between Theory and Practice*, IIMI Country Paper, Pakistan, no. 7 (Colombo: International Irrigation Management Institute, 1995).

66. The quotation comes from 1938. Punjab PWD, Irrigation, #68 of 1908.

67. This was the Mona project, undertaken by WAPDA and USAID. Kerry J. Byrnes, *Water Users Associations in World Bank-Assisted Irrigation Projects in Pakistan* (Washington, D.C.: World Bank), 7. The latter issue is described clearly in Douglas J. Merrey, “Reorganizing Irrigation: Local Level Management in the Punjab (Pakistan),” in *Irrigation Management in Pakistan: Four Papers*, ed. Douglas J. Merrey and James M. Wolf (Colombo: International Irrigation Management Institute, 1986), 35. Such concerns about problems of local water “wastage” were, of course, hardly entirely new. The problem of water “wastage” in the village due to poor maintenance of village channels had been noted as early as the 1880s in R. G. Kennedy’s path-breaking studies of watercourses on the Bari Doab canal. R. G. Kennedy, “Note on the Irrigation Duty of the Bari Doab Canal,” April 1883 (Punjab Irrigation Branch Papers, no. 10, 1905).

68. The phrase “strategic resource” as applied to such communities is from the foreword by Michael Cernea in Byrnes, *Water Users Associations*, iii.

69. Byrnes, *Water Users Associations*, 20.

70. *Ibid.*, 59.

71. See Douglas J. Merrey, “Irrigation and Honor: Cultural Impediments to the Improvement of Local Level Water Management in Punjab, Pakistan,” in Colorado State University Water Management Research Project, *Water Management Technical Report*, no. 53 (1979), and Merrey, “Reorganizing Irrigation,” 26–43. Bandaragoda and Rehman also note the ways in which this situation drew to the fore the operation of “informal institutions” in the villages, like “caste, biraderi, political affiliation and elitism,” which provided informal community networks for dealing with the vicissitudes of surface delivery. Bandaragoda and Rehman, *Warabandi in Pakistan’s Canal Irrigation System*, 69.

72. There is a large literature on “corruption,” but one of the best general discussions of corruption in irrigation is Robert Wade, “The System of Administrative and Political Corruption: Canal Irrigation in South India,” *Journal of Development Studies* 18, no. 3 (1982): 287–328.

73. See chapter 6, n. 35.

74. Concrete measures of growing corruption are of course difficult to come by, but Jean-Daniel Rinaudo found in 2002 that corruption involving bribes to facilitate outlet

tampering implicated about a quarter of the irrigators. Moreover, he cites data suggesting that incomes to irrigation officials from corruption may have amounted to “5 to 8 times their official salary.” Jean-Daniel Rinaudo, “Corruption and Allocation of Water: The Case of Public Irrigation in Pakistan,” *Water Policy* 4 (2002): 405–22.

75. Daanish Mustafa, “Theory versus Practice: The Bureaucratic Ethos of Water Resource Management and Administration in Pakistan,” *Contemporary South Asia* 11, no. 1 (2002): 49.

76. For a good review of the state of the social science literature on these issues in 1989, see E. Walter Coward, Jr., and Gilbert Levine, “Studies of Farmer-Managed Irrigation Systems: Ten Years of Cumulative Knowledge and Changing Research Priorities,” in International Irrigation Management Institute, *Public Intervention in Farmer-managed Irrigation Systems* (Kandy, Sri Lanka: IIMI, 1989), 1–31.

77. This shift in policy emphasis at the World Bank was certainly not to the exclusion of the bank’s earlier emphasis on “poverty reduction,” but the new relationship of these goals was reflected in bank policy statements. See, e.g., the five major development challenges identified by the bank in the mid-1990s, which, in addition to reducing poverty and protecting the environment, included “stimulating the private sector” and “reorienting the government” for this purpose. K. Sarwar Lateef, *The Evolving Role of the World Bank: The First Half Century, An Overview* (Washington, D.C.: World Bank, 1994), 34.

78. This approach was associated in particular with the theoretical work of Douglas North in economics, but it paralleled the approaches to the understanding of local community operation in the management of common pool resources by Elinor Ostrom. See Elinor Ostrom, “Beyond Markets and States: Polycentric Governance of Complex Economic Systems,” *American Economic Review*, 100 (June 2010), 641–72. For an overview of the role of the “new institutional economics” with respect to irrigation more broadly, see Vishal Narain, “Brackets and Black Boxes: Research on Water Users’ Associations,” *Water Policy* 6 (2004): 185–96. See also John D. Cameron, “The World Bank and the New Institutional Economics: Contradictions and Implications for Development Policy in Latin America,” *Latin American Perspectives* 31, no. 4 (2004): 97–103.

79. Michael M. Cernea and Ruth Meinzen-Dick, *Design for Water User Associations: Organizational Characteristics*, Irrigation Management Network paper, no. 30 (London: Overseas Development Institute, 1994), 20–21 (emphasis added).

80. Syed Ayub Qutb and James E. Nickum, “Civil Society and Water Management in the Indus Basin,” *Regional Development Dialogue* 23, no. 1 (2002): 110. As Qamar and Briscoe note, investment in irrigation had declined significantly since “the late 1970s when the last major storage reservoir was completed,” and this was now reflected in seriously deteriorating infrastructure, which made cost recovery a critical issue in most irrigation reform proposals. Briscoe and Qamar, *Pakistan’s Water Economy*, 108–14.

81. Ralf Starkloff and Waheed-uz-Zaman, *Farmers’ Participation, Empowerment, and the Institutional Reform of Pakistan’s Irrigation and Drainage Sector: Key Concepts and Farmers’ Perceptions* (Lahore: Pakistan Program, International Water Management Institute, 1999), 3.

82. As van Steenberg and Oliemans wrote with respect to the costs associated with public tubewells at this time, “Over the years operation and maintenance costs of the deep tubewells had become prohibitive, taking an estimated 50% of all public expenditures of

irrigation and drainage in Punjab (as well as Sindh).” Van Steenberghe and Oliemans, “Review of Policies in Groundwater Management in Pakistan,” 331.

83. Ruth Meinzen-Dick, *Groundwater Markets in Pakistan: Participation and Productivity* (Washington, D.C.: International Food Policy Research Institute, 1996), 3–4. See also Edward J. van der Velde and Jamshed Tirmizi, “Irrigation Policy Reforms in Pakistan: Who’s Getting the Process Right?” in *The Politics of Irrigation Reform: Contested Policy Formulation and Implementation in Asia, Africa and Latin America*, ed. Peter P. Mollinga and Alex Bolding (Aldershot: Ashgate, 2004), 211.

84. World Bank, Staff Appraisal Report, “Pakistan, Punjab Private Sector Groundwater Development Project,” 7. See also van der Velde and Tirmizi, “Irrigation Policy Reforms in Pakistan,” 211–12.

85. The lack of volumetric delivery had shaped the dominant, long-standing water pricing system in the Indus basin, which was linked not to measured quantities of water but to measured crop returns on irrigated land. Though some experiments were undertaken during the colonial period with volumetric pricing, no effective system of volumetric water delivery or pricing was ever developed. See Ali, *Punjab under Imperialism* 169–77. One engineer even proposed a system of bulk water auctions to outlet-based communities (modeled on practice in Lorca, Spain), but such a system was never developed (though similar ideas relating to bulk water contracts were revived under the bank’s plan to meet these difficulties). See F.W. Shonemann, *Report on a Tour of Inspection of Certain Engineering Works in Spain and France during the Year 1913* (Lahore: Punjab Public Works Department, Irrigation Branch, 1914). For an overview of water pricing issues, see Robert C. Johansson, Yacov Tsur, Terry L. Roe, Rachid Doukkali, and Ariel Dinar, “Pricing Irrigation Water: A Review of Theory and Practice,” *Water Policy* 4, no. 2 (2002): 173–99.

86. As the Punjab irrigation secretary told Daanish Mustafa in discussing the reforms: “Provision of water for irrigation is a public service.” Mustafa, “Theory versus Practice,” 45.

87. Asrarul Haq and Bagh Ali Shahid, “Public, Private, or Participatory? Reforming Irrigation Management in Pakistan,” *ICID Journal* 46, no. 1 (1997): 41. Haq and Shahid were, respectively, a deputy director and a superintending engineer in the Punjab Irrigation Department.

88. For a good discussion of the politics leading from the bank’s proposals to government legislation, and of the importance of international financial pressures, see van der Velde and Tirmizi, “Irrigation Policy Reforms in Pakistan,” 211–15.

89. *Ibid.*, 212. For a justification of this proposed new reformed structure by two World Bank officials, see Masood Ahmad and Rashid Faruqee, “Improving Irrigation and Drainage,” in *Strategic Reforms for Agricultural Growth in Pakistan*, ed. Rashid Faruqee (Washington, D.C.: World Bank, 1999), 87–108.

90. See http://pida/punjab.gov.pk/reforms_initiatives.htm. The ultimate aim remained a system with markets playing a central role and with delivery systems increasingly built on “contractual arrangements among water supply agencies and users.” But the key in the shorter run was a new structure of “water entitlements, measurements, and transparency” linking users and suppliers together at all levels.

91. Local studies assessing such projects suggest mixed results. For some early assessments of the reforms in local contexts, see D.J. Bandaragoda, *Institutional Change and Shared Management of Water Resources in Large Canal Systems: Results of an Action Research*

Programme in Pakistan, Research Report, no. 36 (Colombo: International Water Management Institute, 1999), and Starkloff and Waheed-uz-Zaman, *Farmers' Participation*. As Briscoe and Qamar remarked in 2006 on the results of the reforms up until then, the chief lesson was a need for “principled pragmatism”—that is, for continuing commitment to the principles of the bank’s proposals from the 1990s (most notably clear “entitlements” and “transparency” at all levels) even though many practical compromises would be needed along the way. Briscoe and Qamar, *Pakistan's Water Economy*, 114.

92. See Robert Johnson, *Private Tube Well Development in Pakistan's Punjab: Review of Past Public Programs/Policies and Relevant Research*, IIMI Country Paper, Pakistan, no. 1 (Colombo: International Irrigation Management Institute, 1989), 13.

93. As Meinzen-Dick’s work has shown, markets surrounding private tubewells were affected by a variety of local economic factors relating to, e.g., size of landholdings, positioning on watercourses, and reliability of surface supplies. Ruth Meinzen-Dick, *Groundwater Markets in Pakistan*.

94. Ruth Meinzen-Dick, “Private Tubewell Development and Groundwater Markets in Pakistan: A District-level Analysis,” *Pakistan Development Review* 33, no. 4, part II (1994): 857.

95. This occurred with the Punjab Shariat Application Act of 1948. The ongoing symbolic importance of shariat as a marker of national identity, juxtaposed against its limited realm of actual social application, was also evident in the role of shariat in increasing Islamization under General Zia-ul-Haq and later.

96. Matthew J. Nelson, *In the Shadow of Shari'ah: Islam, Islamic Law, and Democracy in Pakistan* (New York: Columbia University Press, 2011).

97. For the phrase “state-society synergy,” see Mustafa, “Theory versus Practice,” 39–40.

98. Even as the World Bank called for a “genuine paradigm shift” in Pakistani irrigation, linked to an emphasis on water rights and incentives, it hardly ignored the ongoing need to understand the river basin as a natural unit. With hydrological interconnections as a backdrop, it had to be “‘managed’ from the mountain tops to the root zone of the Indus Basin.” Briscoe and Qamar, *Pakistan's Water Economy*, 114.

99. Lacey, discussion of paper on “Engineering Problems in Recent River Valley Projects in India” by K. L. Rao, in Institution of Civil Engineers, “Discussion: Engineering Problems,” 463. Some might well have questioned whether all the Indus basin rivers were as “alive” as they were when Lacey wrote, for, in the eyes of some, regions such as the Indus delta below Kotri looked increasingly “dead”: “With barely any water flowing south to the sea, salt water was sucked into the mangroves. The fields of red rice turned to white salt encrustations.” Alice Albinia, *Empires of the Indus: The Story of a River* (London: Norton, 2008), 50.

100. (Punjab) Judicial Flood Inquiry Tribunal, *A Rude Awakening: Report of the Judicial Flood Inquiry Tribunal on the Causes of the Major Breaches in River Indus during the “Exceptionally High Floods” of 2010*, <http://punjab.gov.pk/sites/punjab.pitb.gov.pk/files/Ch1.pdf>.

101. Daanish Mustafa and David Wrathall, “Indus Basin Floods of 2010: Souring of a Faustian Bargain?” *Water Alternatives* 4, no. 1 (2011): 73–74.

102. The floods were undoubtedly linked to global weather patterns, but, as Madhav Khandekar puts it, “although seemingly unprecedented, [they] were well within natural variability of monsoonal climate over the Indian subcontinent.” Madhav L. Khandekar, “2010 Pakistan Floods: Climate Change or Natural Variability,” *Canadian Meteorological*

and *Oceanographic Society Bulletin* 38, no. 5 (Oct. 2010): 167. For a discussion of the impact of global warming on the Indus basin, see also D. R. Archer, N. Forsythe, H. J. Fowler, and S. M. Shah, "Sustainability of Water Resources Management in the Indus Basin under Changing Climatic and Socio-economic Conditions," *Hydrology and Earth System Sciences* 14 (2010): 1669–80.

103. Mustafa and Wrathall, "Indus Basin Floods of 2010," 81. Mustafa and Wrathall suggest the need for more hydrologists—"and even social scientists and public administrators"—within a bureaucracy previously dominated by engineers. In fact, the flood dangers inherent in the embanking of the Indus, related to principles of hydrology and the raising of the river's bed, had long been recognized by some engineers, who at times warned about these dangers in strong terms. See, e.g., R. B. Joyner, Acting Super. Engineer in Sind to Secretary to Govt., PWD, Bombay, 1 November 1890, File #105 of 1891, pt. 1 (Bombay PWD, Irrigation), Vol. 349 of 1890–98, Maharashtra State Archives, Bombay.

104. (Punjab) Judicial Flood Inquiry Tribunal, *Rude Awakening*, 25. For a discussion of flood policies and plans since partition, see Daanish Mustafa and James Wescoat, "Development of Flood Hazards Policy in the Indus River Basin of Pakistan, 1947–1996," *Water International* 22, no. 4 (1997): 238–44.

105. "Floods are part of a natural cycle that can never be fully controlled," the tribunal wrote. "It is time to move towards an integrated approach to flood management to save lives, increase resilience and take advantage of the bounty floods bring. Flooding supports ecosystems which provide services that are essential to human livelihoods." (Punjab) Judicial Flood Inquiry Tribunal, *Rude Awakening*, 334.

106. *Report of the Flood Inquiry Commission, Appointed by the Supreme Court of Pakistan*, 10, <http://www.pakissan.com/english/watercrisis/flood/report.of.flood.inquiry.commission.shtml>.

107. *Ibid.*, 22.

108. Most prominent were questions involving the lands of the Khosas, whose head was a prominent politician. In this case, the tribunal decided that political interference was unlikely since the Khosa lands were far enough away from the river to be safe (as were, it added, the lands of the Legharis, still "the largest landowners in District D. G. Khan"). But it implicated other prominent local leaders, not only for breaches but also for illegal cultivation. (Punjab) Judicial Flood Inquiry Tribunal, *Rude Awakening*, 231.

109. The charges are detailed in the central report, though in the end the report laid more blame on official negligence and the lack of preparation and maintenance. *Report of the Flood Inquiry Commission*, 30–34. The provincial government of Sind also constituted a judicial inquiry commission to look into the causes of the breach. See <http://www.pakistan-today.com.pk/2010/11/25/national/commission-submits-tori-bund-breach-report-to-sindh-cm/>.

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