CULTURAL ENCOUNTERS WITH THE ENVIRONMENT

ENDURING AND EVOLVING GEOGRAPHIC THEMES

edited by

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Contents

5

Wittfogel East and West: Changing Perspectives on Water Development in South Asia and the United States, 1670–2000

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In a conversation on Karl Wittfogel's "hydraulic hypothesis" for the origin of the "Oriental state" in the mid-1980s, Marvin W. Mikesell reflected, "Why doesn't that idea stay dead?"[1] I want to try to answer his question by situating Wittfogel's arguments within a historical, cultural, and practical perspective on water development in two regions, South Asia and North America, over the past three and a half centuries. Water resource comparisons between South Asia and the United States have only occasionally involved independent case studies; more commonly they have involved long-term processes of interaction and exchange.

From the 1970s to the present, water experts in both regions have been debating the roles of the state, community, and private property in guiding water and environmental management (some recent works involving geographers include Chapman and Thompson 1995; Emel and Roberts 1995; Jacobs and Wescoat 1994; National Research Council 1996; Templer 1997; Wallach 1996; White 1997). Controversies have escalated over large dams, river-basin development, irrigation management, aquatic ecosystem degradation, desertification, flood hazards, water laws and pricing, and community-based water management (White 1997).

For much of the twentieth century, American water specialists have regarded themselves as exporters of ideas, technologies, and institutions of water development to regions like South Asia (TVA 1961; Wescoat, Smith, and Schaad 1992). A hundred years ago, however, U.S. scientists, engineers, and lawyers actively imported irrigation innovations from South Asia and other parts of the world for application in the Central Valley of California and elsewhere (Brown 1905; Da-

vidson 1875; Hall 1886; Hilgard 1886; Norton 1853; Smith 1861; Wilson 1890–91, 1894). The roots of policy deliberations concerning water development, property rights, state power, and environmental degradation reach back even further, drawing upon some of the great debates in western social thought of the seventeenth through nineteenth centuries.

My aim in retracing this historical geography of ideas about water development in South Asia and the United States is to show that it is once again time for American water specialists to seek out water management innovations from other regions of the world such as South Asia and to seek a more equal exchange of expertise with such regions. I believe such historical and cultural geographic perspectives have a role to play in informing water policy debates.[2]

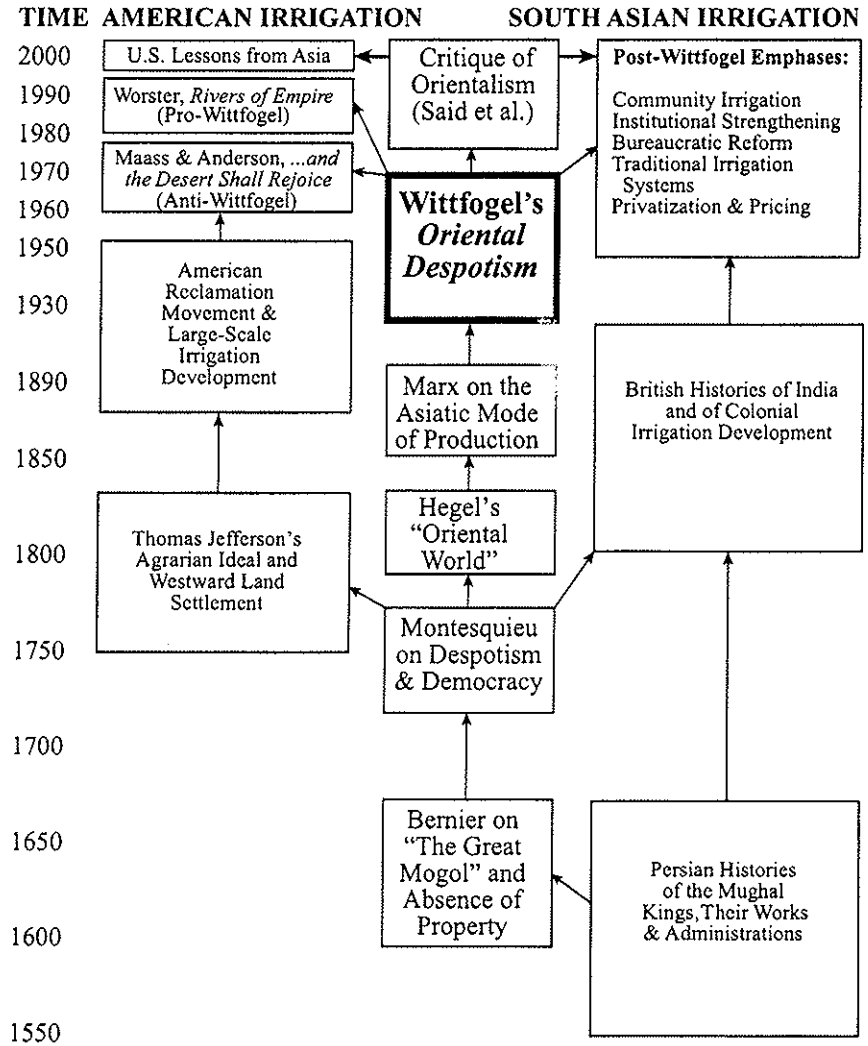
My story begins with Wittfogel's controversial "hydraulic hypothesis," how it has been used in recent research on water and power in the United States and South Asia, and why we need a longer-term macrogeographic perspective (Figure 5.1). The core of the chapter then traces the flow of western ideas about Asian irrigation from the mid-seventeenth century to the present, beginning with Francois Bernier's *Travels in the Mogul Empire AD 1656–1668* and continuing to the live policy debates of the present day. Although ideas about "Oriental Despotism" have had little direct impact on water policy, the section on "Wittfogel: Truth or Consequences?" outlines a chain of indirect influences that account, in part, for why it has not yet died.

WITTFOGEL'S LEGACY

Karl Wittfogel is a complex figure in the history of twentieth-century social and geographic thought (see *Antipode* 1985; Bernard and Reynolds 1992; Ulmen 1978; Wittfogel 1981/1957). Born in 1896 in Germany, he became a teacher and wrote prolifically. As a young member of the German Communist Party he wrote probing, polemical tracts on environmental aspects of geopolitics and social organization during the 1920s (Wittfogel 1985/1929). He developed a Marxist critique of Ratzel, Richthofen, Kjellen, Haushofer, and others, and a geographic critique of contemporary Marxist theory. He took a doctorate at the University of Frankfurt in economics in 1925, developing a special interest in Chinese economic history, and became a research associate at the Institut für Sozialforschung there. Imprisonment in 1933 and outrage at Nazism and Stalinism led him to flee to the United States, break with the communist movement in 1939, and swing sharply to the political right (including a highly controversial role in the U.S. congressional anti-communist hearings of the early 1950s). His substantive contributions focused on Chinese history, pursued through the Chinese History Project at Columbia University and the University of Washington.

These experiences reshaped Wittfogel's arguments about the relations between nature and society, as he sought to draw connections between environmental

Figure 5.1 Wittfogel East and West: Western Ideas about Asian Irrigation.



processes, resources management, and the exercise of social power. His canvas shifted from China to the world scale, inspired in part by his wife, anthropologist Esther Goldfrank, who studied Pueblo Indian cultures of the southwestern United States. His correspondence with Julian Steward (1955) indicates growing emphasis on irrigation agriculture and what Wittfogel termed "hydraulic societies" or "hydraulic civilizations," which referred as much to a pattern of despotic-bureaucratic social organization as it did to irrigation technologies and systems (Wittfogel 1955).

These strands of theoretical, substantive, and ideological writing coalesced over a period of two decades in a grand comparative work on irrigation agriculture and social organization titled *Oriental Despotism: A Comparative Study of Total Power* (1981/1957) which ranged over continents and millennia and strove to classify and evaluate the relationships between water, culture, and power in ways that spoke to the most controversial political debates of his times. Wittfogel published numerous extensions of the arguments in *Oriental Despotism* from positions at Columbia and the University of Washington until his death in 1988, which helped perpetuate the debate; but that one work became the benchmark and straw man for subsequent generations of social researchers on water resources. The story of its influence is interesting for many reasons, in part because it was initially engaged by cultural anthropologists and archaeologists, later by social scientists and water resources specialists. It is to this progression of debates about Wittfogel's legacy that we now turn.

Oriental Despotism sought to link the development of large-scale irrigation agriculture with the absence of private property, the emergence of complex bureaucratic social organization, the entrenchment of political despotism, and the experience of "total terror" (Wittfogel 1981/1957). Even more provocatively, Wittfogel asserted that the best twentieth-century example of this threatening conjunction of environment, technology, society, politics, and despair was the Soviet Union.

Oriental Despotism stimulated waves of scholarly criticism of its empirical, theoretical, and ideological errors. Some geographers tended to be more impressed by Wittfogel's breadth of investigation (Jones 1958; Spate 1959). However, Shabad (1959) and Gourou (1961) wrote sharp rebuttals that emphasized Wittfogel's abuse of concepts of the "Oriental," "despotic" and "hydraulic." Some water resources faculty read it, but it had no immediate impact upon water resources research or management.

In addition to his pre- and protohistoric errors about the causal role of irrigation in the origin of complex social organization, Wittfogel's global classification of irrigation systems failed to even mention the colonial irrigation programs of Asia and Africa, or the large water bureaucracies of the U.S. Bureau of Reclamation, the Tennessee Valley Authority (TVA), and the postcolonial water authorities of India, Pakistan, and Bangladesh—that is, the largest and most state-centered water systems in world history. These errors should have been enough to put the "hydraulic hypothesis" to rest, and for most scholars they have.

But Wittfogel is still invoked, reexamined, and often dismissed again (Bernard and Reynolds 1992; Sidky 1997; Ulmen 1978). In the western United States, Maass and Anderson (1978) drew upon Jean Bruhnes' ideas to test Wittfogel's propositions in six water case studies, concluding that powerful local irrigation organizations more often manipulated national reclamation agencies than vice versa. Focusing on large-scale water development in California, however, Worster (1985) adapted Wittfogel's perspective to what he termed a "state-capitalist mode of production." Although more recent authors seem to have set Wittfogel himself aside for the moment, research on "water and power" is growing, if anything, and often owes something to debates sparked by Wittfogel (Emel and Roberts 1995).

Outside the water resources field, Richard Peet organized an effort to reexamine Wittfogel's ideas in a special issue of *Antipode* (1985), arguing that attention should be directed toward Wittfogel's (1985/1929) early contributions to the fields of geographical materialism and the nature–society dialectic (also Chappell 1971; Peet 1988). Large literatures have retraced the flow of ideas about "Oriental despotism," "hydraulic civilization," and the "Asiatic mode of production" (O'Leary 1989).

But little has been written about the international flow of ideas and associated technologies, commodities, and institutions between irrigated regions of the world on the timescale of centuries. Aside from Maass and Anderson (1978) and Worster (1985), the influence of Asia and Europe on North American water development, and vice versa, in more recent decades remains a neglected subject. It is this story that I sketch out below.

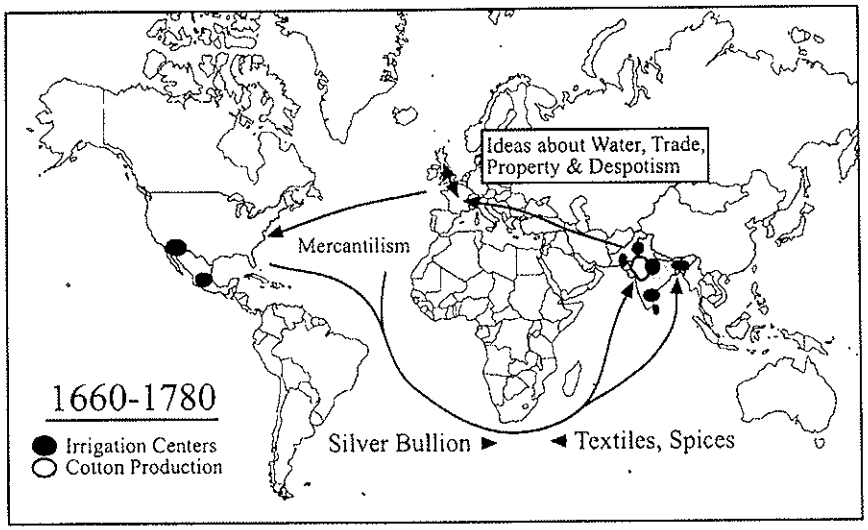
EARLY ENCOUNTERS, 1660–1780

The story begins at the climax of the Mughal empire in India, an empire that expanded during the sixteenth and seventeenth centuries to cover much of South Asia, and that drew the keen attention of European travelers and traders who initiated trade of bullion from the West Indies for finished textile goods and spices from the East Indies (Figure 5.2).

They also trafficked in ideas about water resources, property rights, and political organization. A particularly influential travel account was written by the French physician-philosopher Francois Bernier, who attended the courts of the sixth Mughal emperor Aurangzeb Alamgir in Agra and Delhi in the 1660s.

Upon his return, Bernier (n.d./1670: 200) wrote a letter to Jean-Baptiste Colbert, the powerful finance minister to Louis XIV on "the principal cause of decline of the states of Asia." Bernier wrote that, "As the ground is seldom tilled otherwise than by compulsion, and as no person is found willing and able to re-

Figure 5.2 Early Encounters, 1660–1780.



pair the ditches and canals for the conveyance of water, it happens that the whole country is badly cultivated, and a great part rendered unproductive from the want of irrigation" (Bernier n.d./1670: 226–27). He attributed these deficiencies to the absence of private property among the agricultural and aristocratic classes, excessive imperial taxation, and the escheat of personal property to the king.

Bernier thus associated despotism with *deteriorating*, not magnificent, irrigation works around Delhi and Agra. This rendering stood in sharp contrast with Bernier's descriptions of imperial monuments such as the Taj Mahal and Yamuna riverfront gardens that surpassed in beauty the views from the Pont Neuf (Bernier n.d./1670: 297ff.)! It is important to keep in mind that Bernier's letter was written at the height of French absolutism and monumental garden construction at home, and expansionism overseas. It was thus more a veiled and cautionary tale for the French leader than it was a purely objective account of India. He concluded the letter to Colbert with the general geographical assertion: "take away the right of private property in land, and you introduce, as a sure and necessary consequence, tyranny, slavery, injustice, beggary and barbarism . . . it is the prevalence or neglect of this principle which changes and diversifies the face of the earth" (Bernier n.d./1670: 238). Although Bernier did not discuss private property in water, his arguments would later be extended to water as well as land resources.

Interestingly, the irrigation works of northern India at this time were small in scale, local in effect, and simple in technology—as indicated by evidence from Mughal paintings of wells, tanks, and Persian wheels. There were a few large perennial canals on the Yamuna River, such as the one constructed by Firoz Shah Tughluq in the late fourteenth century and renovated by the third Mughal ruler, Akbar, and a Persian noble, Ali Mardan Khan, in the late sixteenth to seventeenth centuries. A large map of Ali Mardan Khan's canal makes it appear monumental, but the map also depicts a large number of canal turnouts for labeled properties along its length (Gole 1989).

The predominance of small irrigation systems and complex diversions from larger canals invites the question: How did western scholars come to associate large-scale imperial irrigation works with political despotism in South Asia?

To answer this question, we need to examine Bernier's influence on subsequent currents of European social thought. His account appeared in Paris in 1670, in English in 1671, and was reprinted frequently in Europe—it was a "bestseller."

Bernier was cited by the most influential social theorists of enlightenment France and England, from John Locke, who was a personal friend of Bernier's to Encyclopedists like d'Herbelot. Utilitarians and Marxists carried these ideas further. This general chronology has been recounted in recent histories of ideas about Orientalism and the Asiatic mode of production (O'Leary 1989), but less attention has been given to the inclusion of ideas about water, a theme outlined below:

1. In his second treatise on government, published in 1690, John Locke repeated the connection between despotism and the absence of private property (Locke 1965/1690: 430–31; Locke 1812).
2. In 1748, Baron de Montesquieu drew upon Bernier and Locke to argue in *The Spirit of the Laws* that aridity was associated with, and helped explain, the occurrence of despotism and the absence of private property in Asia (Montesquieu 1949/1748: 57–65, 224, 226, 269).
3. In *The Wealth of Nations*, Adam Smith noted the importance of canals in the domestic economies of China and Hindustan. He appreciated Bernier's critical perspective on public works in Asia, stating that there were other "accounts of those works which have been transmitted to Europe . . . by weak and wondering travelers; frequently by stupid and lying missionaries" (Smith 1976/1776: vol. 2: 256). But Smith went on to speculate that Asian rulers might have placed greater emphasis on canals and roads to increase land revenues, upon which their wealth was based, but he concluded that such public works are better managed by local governments.
4. John Stuart Mill spent most of his career as an employee of the East India Company in London. He stated in his *Principles of Political Economy* (1965/1848: 13) that irrigation works were occasionally patronized in "the enlightened self interest of the better order of princes" in Asia. Finally,
5. Marx and Engels returned to Bernier to re-assemble all of the pieces of this puzzle in a new way that associated the absence of private property with large-scale irrigation works and political despotism in the arid continental

environments of Asia, which they characterized as a distinctively Asiatic mode of production. (Avineri 1969)

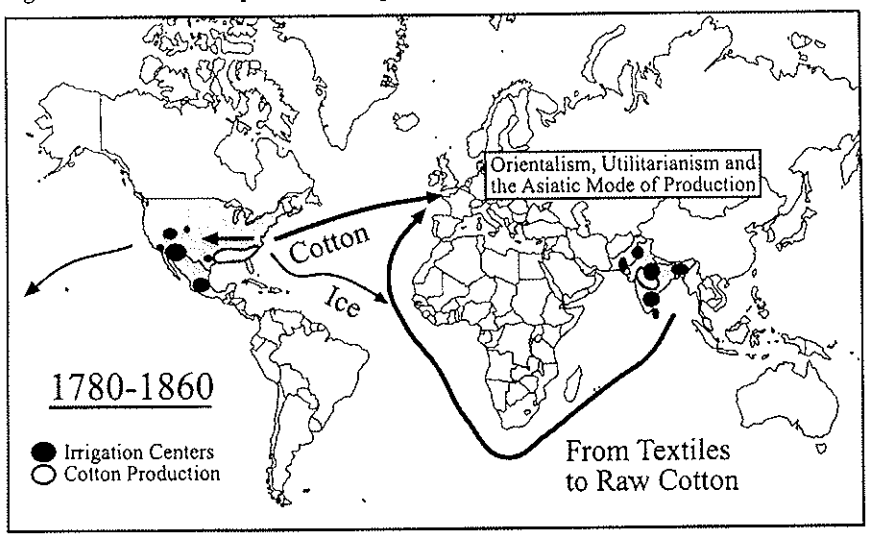
Before examining Marx and Engels, who influenced Wittfogel, in more detail it seems important to ask to what extent this chain of ideas accorded with or influenced water development patterns or practices in either Asia or the Americas.

FROM COMPARISON TO EXPERIMENTATION AND CRITIQUE, 1780–1860

There is little evidence that any of the ideas assessed thus far influenced water management in either South Asia or the United States (Figure 5.3). Some British officers studied Mughal and early travel accounts (Colvin 1833; Yule 1846). Montesquieu's ideas certainly influenced Jefferson, Madison, and Franklin on politics and property. And those ideas, among others, may have constrained federal involvement on river, harbor, and canal projects of the 1780s through 1820s. Although Bernier's direct influence on American social thought appears slight, and there was no direct connection between ideas about the ownership of water and land as yet, there was a broad flow of ideas about property, trade, and despotism to which the literature on India and the East India Company contributed.

American leaders took offense at comparisons by Abbe Raynal (1776) and oth-

Figure 5.3 From Comparison to Experimentation and Critique, 1780–1860.



ers of the East Indies as "decadent" and the West Indies as "savage." European political leaders sought to draw lessons from the revolution in the American colonies and apply them in India. They engaged in heated comparisons and debates about colonial tax and land-tenure policies. Soon after his defeat in the American revolution, for example, Cornwallis became governor-general of the East India Company, where in 1793 he enacted sweeping changes in land-tenure laws that established a new *zamindari* propertied class. In London, Edmund Burke launched impeachment proceedings against the previous governor-general, Warren Hastings, on grounds of corruption. When Hastings tried to invoke the accounts of travelers like Bernier to justify continuation and incremental transformation of "Oriental" customs, Burke, a conservative Whig, disputed the entire notion of "Oriental Despotism" as unsound in theory and evidence (Burke 1981).

Back in India, battles arose between those whom historian Eric Stokes (1959) has called the "Paternalists," the "Utilitarians," and the "Evangelicals." The Paternalists patronized studies of customary law and resource use, partly to guide the renovation of historic waterworks like the Ganges and Yamuna canals, as well as to increase revenues. Utilitarians, by contrast, advocated radical legal reforms based on the ideas of Jeremy Bentham (1962/1838–43: 179–94). With James and John Stuart Mill in the employ of the East India Company, and high-ranking disciples in India, they had the muscle to force large-scale experiments in legislation, adjudication, and finance—in which private property was eschewed as a likely drain on company revenues (Mill 1965/1848)!

Both regions were surveyed with similar mapping projects that followed coastal harbors to major inland waterways such as the Ganges, Indus, Missouri, and Mississippi rivers into the continental interiors. Government-sponsored geographical surveys, such as those of James Rennell in India and Louis and Clark in the United States, followed and mapped river corridors (Edney 1997: 98–102; Rennell 1785). Freedom of navigation and commerce was invoked both in India, to gain access to the Indus River, and in North America to open the Mississippi River. The principle of free navigation was followed in each case by military conflicts and cessions of territory to England (Wescoat 1996).

Trade relations between the American colonies and South Asia remained limited through the late eighteenth century. Perhaps the earliest water resources connection was the export of ice from New England to Bengal as coolant as well as ballast. This situation would change, however, with westward expansion in America and colonial expansion in India in the mid-nineteenth century. To understand how those economic changes were related to intellectual and ideological debates, we need to return to Marx and Engels.

During the nineteenth century, criticisms of colonial experiments began to converge with ideas about Oriental societies. On June 2, 1853, Marx wrote to Engels that "on the formation of Oriental cities, one can read nothing more brilliant . . . than old Francois Bernier," noting in particular Bernier's comments on

the absence of private property (Avineri 1968: 425–26). Engels replied that "Old Bernier's material is really very fine. It is a real delight . . . to read something by a clearheaded old Frenchman, who keeps hitting the nail on the head without appearing to notice it" (Avineri 1968: 429).

It was Engels who shifted the conversation and context from cities to irrigation and public works, a thesis that Marx picked up and published two weeks later in the *New York Daily Tribune* when covering parliamentary debates on renewal of the East India Company charter (Avineri 1968: 93–101).[3] Marx criticized British rule as a sickening yet necessary stage to pass beyond Oriental Despotism, which he caricatured as governments of plunder and public works resting upon a sea of unchanging, insular, superstitious village communities.

These arguments were overtaken by the 1857 rebellion that led to the transfer of control from the East India Company to the British crown; by Marx's shift in interest away from Asia; and by the American Civil War which blocked the flow of cotton from the southern United States to the mills in England, contributing to the expansion of canal irrigation in India and Egypt (Farnie 1979).[4]

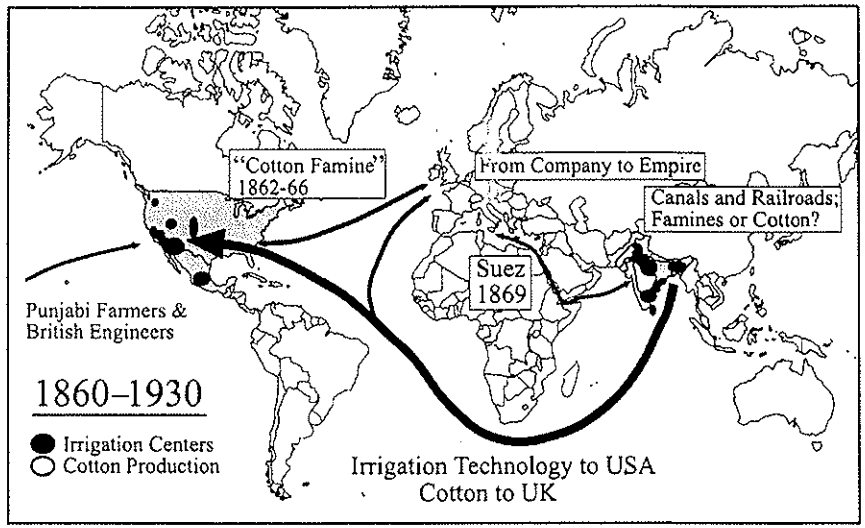
INDIAN INFLUENCE ON AMERICAN IRRIGATION, 1860–1930

Expansion of perennial canal irrigation in India during the late nineteenth century represents one of the most dramatic transformations of land and water resources in the modern era—in terms of both the extent and rates of change in land cover, irrigation technologies, and institutions (Figure 5.4). Early irrigation projects in northern and southern India were dramatic and, for the most part, profitable (Wallach 1996; Whitcombe 1982). Colonial engineers and officers sought to combine customary and statute law, traditional and scientific practices, political and economic objectives (Ali 1988; Gilmartin 1994, 1995; Zafar 1985). British engineers looked to southern Europe, particularly Spain, France, and the Piedmont region of Italy, for practical irrigation lessons (Moncrief 1868; Smith 1849, 1855). They showed little interest in the fledgling irrigation systems of American irrigators in Utah or California, or in the older systems of Mexico and the middle Rio Grande Valley.

American engineers and agriculturalists, by contrast, gave close attention to water development in India. Acting on behalf of the U.S. Congress, the State of California, and irrigation investors, American engineers visited Indian works. They prepared reports on irrigation structures, economics, and institutions. The influence of Indian irrigation in the western United States involved both diffusion of innovations and differentiation of American from Indian approaches.

American engineers imported innovations in hydraulic engineering and earthworks technologies, for example, and they lamented the shoddy construction at home compared with structures built to last in India. The concept of large-scale water development diffused, *contra* Wittfogel and others, from colonial India and

Figure 5.4 Indian Influence on American Irrigation, 1860–1930.



not from the precolonial empire of the Mughals. It is no exaggeration to say that colonial India demonstrated the large-scale possibilities and problems associated with state-sponsored water development in sparsely populated semi-arid regions, such as the Punjab. Although not all American scientists supported irrigation development—George Perkins Marsh (1874), for example, testified to the U.S. Congress on the "evils" of irrigation—the reclamation movement gained momentum in the late nineteenth century.

The diffusion of irrigation innovations was aided by the migration of British irrigation engineers and Punjabi cultivators to the Imperial Valley in the first decade of the twentieth century (Flynn 1892; Jensen 1988; La Brack 1988; Leonard 1992; Mazumdar 1984). Another possible, but as yet unexamined, connection may have involved a common set of British investors in American and Indian irrigation projects (Lee 1980).

American irrigation promoters also stressed differences between the United States and India. These included differences in labor supply and costs, explaining the scale and solidity of Indian irrigation works by low labor costs (Wilson 1894). American engineers were amazed at, and in some cases envious of, the level of state control and water ownership in India. They often cited the Indian Canal and Drainage Act of 1873, whose preamble runs: "Government is entitled to use and control for public purposes the water of all rivers and streams flowing in natural channels." It remains the law to this day. American legal treatises compared irrigation laws in India and other countries with those taking shape in the western United States (Kinney 1912).

A member of the Board of Commissioners for the Central Valley of California wrote in 1875 that "compensation for entry upon private lands is arbitrary and minimum. . . . It is utterly impossible that such conditions could exist in the United States, *except where the Government enter[s] new territory*" (emphasis added, Davidson 1875: 39; Jackson et al. 1990). "New territory" was exactly how some irrigation promoters regarded the Central Valley of California. Commissioner Davidson added that "As compared with the Italian system, the greater undertakings of India and their whole system of distribution seem more analogous to what is required in the United States" (Davidson 1875: 40). The Central Valley commissioners displayed not a trace of irony in applauding the government of India's combination of paternalism, on behalf of poor cultivators, and revenue enhancement, in these words:

> It was generally held that the property in water could not safely be intrusted to private hands; that the ignorant cultivators would, without the intervention of the government, be helpless against a powerful corporation . . . At this time it was thought by the government that the profits of irrigation were great and immediate, and that they should inure to the government and not to a corporation. (Commissioners 1874: 55)

> The full development of many of our broad valleys depends wholly and solely upon the adoption of some of these propositions. (Davidson 1875: 69)

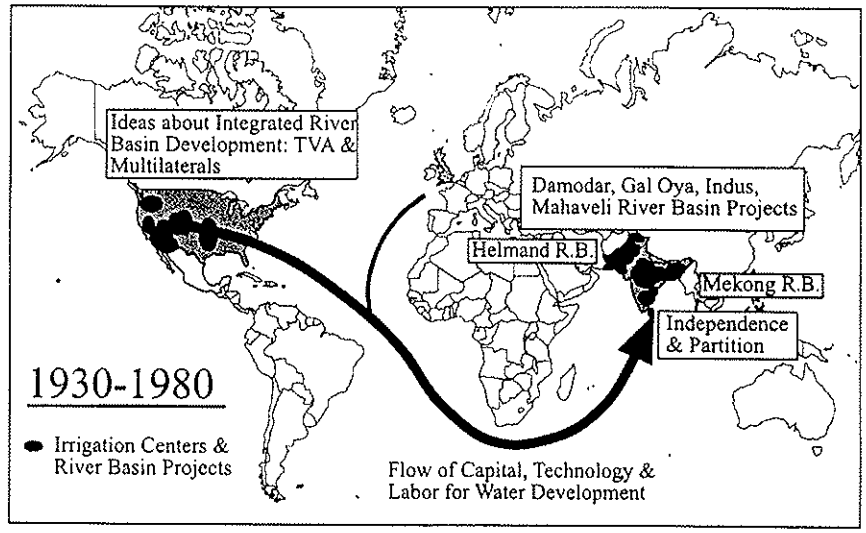
I quote these influences of India on the United States at length because they are less well-known than, and yet are directly related to, subsequent influences of the United States on India.

AMERICAN INFLUENCE ON INDIAN WATER DEVELOPMENT, 1930–1980

By the 1930s, the balance of trade in water resource innovations had shifted from India to the United States (Figure 5.5). American water engineers and planners began to export new technologies of dam construction, hydropower engineering, and groundwater development. Significant numbers of South Asian students studied water resource engineering and planning in American universities, federal agencies, and consulting firms—with consequences that have yet to be fully appraised (Wescoat, Smith, and Schaad 1992).

The jewel in the American crown, however, was the Tennessee Valley Authority (TVA), which was exported around the world as a model for comprehensive state-sponsored regional water development even as its further application was rejected in the United States (Clapp 1955; Hargrove 1994; Lilienthal 1944). The Damodar Valley Corporation in India and the Gal Oya project in Ceylon served as a warm-up for the massive Indus, Mahaveli, and Mekong development pro-

Figure 5.5 American Influence on Indian Water Development, 1930–1980.



grams of the postcolonial era (Damodar Valley Corporation 1992; TVA 1961; Uphoff 1992).

Although these latter river-basin schemes were closely tied with U.S. Cold War geopolitical strategies, they were accompanied by vigorous promotion of principles for reforming public finance through project evaluation methods, water pricing, and water markets, reforms that made little headway in practice at home or abroad.

American water law had some influence in South Asia, though it and other branches of American law have been viewed as overly individualistic by Indian jurists (Baxi 1985; Beer 1979; Singh 1991; Vani 1992). American precedents on interstate streams, for example, were invoked in the early 1940s debates on the apportionment of the Indus River between Punjab and Sind—debates that were superseded by the partition of India and Pakistan in 1947 (Government of Sind 1944; Gulhati 1973; Michel 1967).

Legal frameworks for water-user associations, irrigation districts, and bureaucratic organization were promoted in U.S. development projects, but many were not sustained beyond the life of project funding (Radosevich and Kirkwood 1975). There is, however, increasing concern in India and Pakistan about the need for water-law reform, for which the U.S. experience is perceived to be relevant perhaps as much as a source of difference as possible diffusion. Geographic research on water law is not yet part of this exchange (Templer 1997).

The first U.N. Conference on Natural Resources at Lake Success, New York, in 1949 included a session on water resources that emphasized U.S. experience in

river-basin development and in particular the Tennessee Valley Authority (United Nations 1950). A French participant stated, perhaps ironically, that the TVA had succeeded because it had "dictatorial authority," to which TVA officials convulsively responded with the rhetoric of "grassroots democracy." Unfortunately, this brief exchange did not stimulate a sustained discussion of the political economy of international water programs.

In subsequent decades, the United States became deeply involved in large-scale water development in the Indus, Mekong, Helmand, and Nile basins, to name a few. The Indus has special relevance for this discussion in light of the major role played by the United States in facilitating the treaty and then financing a massive program of water development (White House 1964; Lieftinck 1968; Duloy and O'Mara 1984). In one of the most detailed international river-basin studies carried out to date, geographer Aloys Michel (1967) noted the difference between U.S influence in Pakistan, which extended to technical expertise and construction, compared with India, which developed its own technical capabilities. The experience of Pakistan underscores the Cold War geopolitics of international water programs, as Pakistan grew to become the third largest USAID (United States Agency for International Development) recipient during the Soviet occupation of Afghanistan and then plummeted to no aid at all after the Soviet withdrawal and the selective resumption of U.S. nuclear nonproliferation policy. Curiously, these developments in the Indus River basin coincided with, but showed little influence from, academic debates about Karl Wittfogel's ideas about hydraulic societies.

Wittfogel: Truth or Consequences?

Oriental Despotism shook up the academic world. Rather than recite criticisms of the "truth" of Wittfogel's work, I want to concentrate here on its "consequences." The lasting scholarly contributions of *Oriental Despotism* were: (1) its identification of key social structures in water management; (2) its emphasis on the geographical context of water systems; and (3) its global and comparative perspectives on water development (Figure 5.6).[5] Wittfogel erred on many of the causal relations among these variables, but he was the first water-resource theorist to bring political, social, psychological, technological, and environmental variables together under one cover. At the same time, comparative geographic research on water-management systems remains, to this day, at a rudimentary level of development (Smith 1861; Wescoat 1994b).

What were the consequences? The first generation of Wittfogel's critics were leading historians, archaeologists, and social theorists who focused upon his ideas about either ancient societies or the Soviet Union (Butzer 1976; Habib 1961; Steward 1955). These early critics focused on long-term change in ancient irrigation systems.

A second generation of critics turned toward the social aspects of modern irrigation systems (Hunt and Hunt 1976). They examined the relationships between

Figure 5.6 The Structure of Wittfogel's Analysis.

Variables	Categories		
Climate	Core (arid)	Margin (mesic)	Submargin (humid)
Water Technology	Canal Irrigation	Hydroagriculture	Rainfed Agriculture
Hydraulic Density (Economic Role)	Compact (national hydraulic economy)	Loose (regional hydraulic economy)	Loose II (local hydraulic economy)
Property Relations	Simple (state property)	Semi-Complex (includes personal property)	Complex (includes real property)
State Functions	Hydraulic Works	→	Defense, Communications, Transport, and Trade
Human Experience	Terror	→	Freedom
Political Organization	Despotism	→	Democracy

bureaucracy, community, and property in irrigation systems. During this period, there was a shift from large-scale TVA approaches to innovative social and institutional experiments.

The "Management" Revolution, 1970–1980

These trends led to the present generation of development sociologists, anthropologists, and applied geographers who work with the Ford Foundation, multilateral development organizations, and bilateral agencies on institutional projects to improve water management in South Asia (Coward 1980; Freeman and Bhandarkar 1989; Merrey 1979; Uphoff 1992; Wade 1988). Although the point should not be exaggerated, these social scientists were to some extent influenced by theoretical debates sparked by Wittfogel in the 1950s and 1960s.

EMERGING EXPERIMENTS AND PROSPECTS, 1980–2000

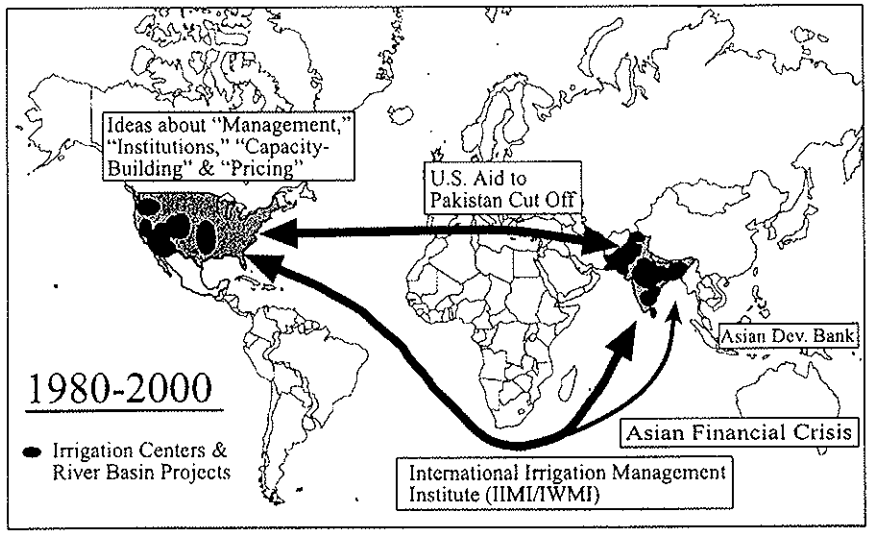
Emerging relations between North America and Asian water management indicate some fundamental shifts that have special relevance for cultural geographers

(Figure 5.7). Struggles over monumental projects in the Narmada basin of India, the Three Gorges Dam in China, the Flood Action Plan in Bangladesh, and the Glen Canyon Dam on the Colorado River give increasing attention to cultural impacts and to cultural analysis of all aspects of water use (Chapman and Thompson 1995; Rogers, Lydon and Seckler 1989; Verghese 1990).

Several research trends and opportunities provide a fitting conclusion to this investigation of cultural encounter and exchange between Asian and American water systems. First, it seems time once again for American water managers and scientists to look overseas, particularly to South Asia, for experiments that may be instructive for the United States, as occurred 100 years ago. Cultural geographers from the United States who have participated in these Asian irrigation experiments have a special role to play (Wallach 1996), as do social geographers associated with the International Irrigation Management Institute (Bhutta and Vander Velde 1992).[6] Research on evolving cultural landscapes of water management seems especially promising. Building upon Francois Bernier's accounts of deteriorating canals outside the Agra of the Taj Mahal, we might reexamine the relations between beauty and efficiency in waterworks (Wallach 1996; Wescoat 1985). Bret Wallach (1996) has woven together aesthetic, emotional, and practical essays on irrigated landscapes of India, with some involvement with development organizations such as the Ford Foundation and International Irrigation Management Institute.

Cultural research in related fields has begun to integrate theoretical and practical inquiry in innovative ways. Stephen Lansing (1991) combines social theory

Figure 5.7 Emerging Experiments and Prospects, 1980–2000.



and development research on traditional and modern irrigation systems in Indonesia, leading to innovative hybrid water-management strategies. Norman Uphoff (1992) brings postmodern theory to bear on irrigation development planning in Sri Lanka, again with a commitment to going beyond critique to advance water-management systems.

In the United States, a report of the National Research Council (1996) on *A New Era for Irrigation* indicates that some of the most creative social research on irrigation has occurred in Asia by international teams of Asian and American social scientists. Beginning in the 1950s, American water plans and planners displayed an amnesia in which the U.S. Constitution, rather than international experience, was regarded as the historical foundation for national water planning (United States, President's Water Resources Policy Commission 1950).

Western ideas about South Asian water development reviewed in this chapter include numerous errors of cultural fact and judgment. To lessen such problems in the future, there is a need for advances in cross-cultural comparative theory and method (Wescoat 1994b). Geographic comparison remains largely subjective and unscientific, as Wittfogel argued, but also demonstrated, some forty years ago. We need more insightful comparisons, for example, of flood hazards problems and planning in the Ganges–Brahmaputra basin, which has just completed the largest multilateral flood investigations in history with the Indus, Mekong, and other river basins (Jacobs and Wescoat 1994). A Social Science Research Council project is comparing the environmental effects of property rights in different regions of the world (Wescoat 1994a). Schwartzberg (1992) has given a finely crafted perspective on historical and cultural geography's cartographic representation in South Asia, including "maps" of canals and water systems.

Research on long-term change in water management, of the sort Wittfogel pioneered, indicates that analogies may be as important as formal comparisons. Analogies translate experiences gained in earlier times and places to new situations and places. A team of Pakistani and American water scientists used analogies to assess the potential impacts of climate change in the Indus basin (Wescoat 1991). The study then sought to integrate modeled and unmodeled impacts and to combine high science and appropriate technologies.

Finally, recent work by new cultural geographers and colleagues is opening up promising lines of inquiry. Cosgrove and Petts (1990) drew together contributions from cultural, historical and physical geographers in a highly stimulating collection on *Water, Engineering and Landscape* that, with further collaboration and integration, could advance the field. Cosgrove et al. (1995) then contributed to the European Community Environmental Research Programme by convening British, Danish, Italian, and Swedish teams to focus on national perspectives on water regulation in the mid-twentieth century. These works incorporate themes of power and control with beauty and livelihood in ways that point toward new contributions for cultural geographers and new practical applications.

At present cultural geography plays little role in policy analysis and design. In

my experience, water managers in India, Pakistan, Bangladesh, and the United States—even the most tough-minded water engineers—are fascinated by cultural geographic aspects of their field, including its conflicts and power relations, and would benefit from clear practical analyses of these issues. The pitfalls must not be discounted. Wittfogel's legacy rose through a commitment to contemporary political concerns, and fell through a peculiar conflation of ideology and science. The seeds for new syntheses of cultural geography and water resources geography are now germinating on that well-worked ground.

NOTES

This paper has been in formation since my early days as an M.A. student with Marvin Mikesell in the late 1970s. I am sure Marvin would encourage me to acknowledge debts to other colleagues at Chicago: Karl Butzer, Norton Ginsburg, Paul Wheatley, and Robert McC. Adams. Earlier versions of this paper were given in the lectures honoring Joseph Schwartzberg at the University of Minnesota and Edwin Hammond at the University of Tennessee.

1. Circa 1985. Marvin Mikesell also perpetuated Wittfogel's influence by regularly assigning Marx's article on "The British Rule in India" (Avineri 1968: 83–89) and Wittfogel's paper on "Hydraulic Civilizations" in *Man's Role in Changing the Face of the Earth* (1954) in Geography 313 (Cultural Geography) at the University of Chicago. For reflections on the persistence of Wittfogel, and a humorous comparison with Elvis, see Butzer (1996).

2. I have presented these arguments in projects sponsored by the U.S. Environmental Protection Agency (Wescoat 1991) and the National Research Council (1996).

3. This is the newspaper article Marvin Mikesell has used in his cultural geography course.

4. Habib (1983) provides a detailed critique of Marx's perceptions of India.

5. Geographers engaged in river-basin planning, such as Harlan Barrows and Gilbert F. White, were already engaged in integrating social and environmental factors in water development. Although they were less critical of relationships between civil society and the state, a more detailed comparison of their approaches and Wittfogel's is warranted.

6. Recently renamed the International Water Management Institute (IWMI) to broaden its scope beyond irrigation and drainage.

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6

Wetlands as Conserved Landscapes in the United States

James A. Schmid

Wetlands are those parts of the vegetated landscape where water is present above, at, or near the surface of the ground for long periods during the growing season for higher plants. Many are associated with flowing watercourses, but they also may be found in isolated depressions and broad flats that trap surface runoff or wherever groundwater emerges at the surface in springs and seeps. Popular terms for various wetlands include swamps, marshes, sloughs, bogs, fens, mires, potholes, wet prairies, wet meadows, pocosins, sponges, peatlands, and muskegs. The term "wetland" first appeared in print in 1778 but was popularized during the mid-twentieth century to identify landscapes where land and water meet (Shaw and Fredine 1956). Unlike open-water features, wetlands are not permanently covered by water so deep that emergent plants cannot grow on them; the vegetated, shallow margins of such water bodies, however, may constitute wetlands.

Wetlands have many valuable characteristics. They are part of the natural hydrologic storage system,where floodwaters reside during peak episodes of snowmelt and precipitation without harm to people or property. Wetland plants filter pollutants from, and may contribute oxygen to, surface waters, enhancing their quality. Wetlands typically are occupied by unmanaged communities of higher plants and may provide habitat for many rare species of plants and animals. The biological productivity of many North American wetlands is high, and is comparable to that of the highest-yielding farmlands and tropical rainforests (Lieth 1975). Wetlands are essential habitats during the reproductive cycle for many birds, fish, and other animals. Hence their biological significance far exceeds their relative acreage in the landscape.