

A HISTORY OF WATER

WATER CONTROL AND

RIVER BIOGRAPHIES

EDITED BY

T. TVEDT & E. JAKOBSSON

I.B.TAURIS



# **A History of Water**

Volume 1: Water Control and River Biographies

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*Edited by T. Tvedt and E. Jakobsson*

Volume 2: The Political Economy of Water

*Edited by R. Coopey and T. Tvedt*

Volume 3: The World of Water

*Edited by T. Tvedt and T. Oestigaard*

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Volume 1: Water Control and River Biographies

Edited by  
T. Tvedt and E. Jakobsson

**I.B. TAURIS**  
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## **Introduction: Water History is World History**

**Terje Tvedt & Eva Jakobsson**

More than 2,000 years ago Pausanias, the Greek geographer who travelled throughout the ancient world, declared that no city had the right to call itself a city unless it had at its centre an ornamental fountain. Fountains illustrated then – as they have done throughout the ages – an ideological and cultural notion of the triumph of civilization over nature: water, the giver and taker of life, in the fountain appears at the control of human beings. The fountain also symbolizes a more mundane and direct material fact – no city and no country has been able to exist or develop without subjugating water in one form or another to the demands of human society. This universal natural and social fact alone makes water history relevant world history.

The struggle to control water is a struggle without end. Most people do not reflect on the historical significance of the subterranean labyrinth honeycombing the ground beneath the modern urban architecture; or how every time someone turns on a tap, there is a gurgle of water somewhere, deep below the houses and streets, made possible by the work of water planners and engineers over generations. To bring water to an urban population is a ceaseless endeavour that has been, and continues to be, fought in cities worldwide, from Mohenjo-daro, a centre of the Indus Valley civilization that flourished around 2,500 BC, crisscrossed by streets with covered drains, to the enormous pipe-systems necessary to serve the water needs of the present mega-cities. Mankind's continuing relation to water explains why Sextus Julius Frontinus (AD 40–103), who was responsible for providing ancient Rome with the fresh water it needed, can be so easily understood today, when he complained, almost 2,000 years ago, at the fame afforded to the

beautiful but useless Egyptian pyramids and Greek temples, while the absolutely essential water structures of Rome were disregarded. The Pantheon and the Coliseum may have brought Rome fame but the city owed its existence to the water running beneath it. Impressive aqueducts, both above ground and underground, transported water from outside the city to its very centre, and made Rome possible. The multiple uses and the steadily increasing demand for water – water for transport, for electricity and energy, for chemistry and industrial production, for leisure and ornament, for health and cleaning – make water planning an aspect of development itself.

A history of water control should, therefore, consider the three types of temporality that the French historian Fernand Braudel (1902–85) employed. The first of these – the *événementielle* – involving short-lived dramatic ‘events’, should focus on the implementation of large water projects, entrepreneurial engineers, sudden floods or droughts. *Conjoncures*, Braudel’s term for cyclical processes that might last up to half a century, still slow but with perceptible rhythms, could include, for example, planning traditions, dominant scientific notions and a level of available technological solutions, etc. Finally, water history definitely must also deal with what Braudel called ‘*la longue durée*’: historical waves of great length – perhaps the most fascinating of the three temporalities for the water historian.<sup>1</sup> This type of temporality can be regarded as a kind of ‘geographical time’, focusing on relationships between humans and the environment, that change almost imperceptibly; being a history of repetition and recurring cycles based on seasons or longer natural cycles affecting the cycle of the seasons themselves: such as climate changes, rivers finding new courses, etc. It entails a focus on those aspects of everyday life that might remain relatively unchanged for centuries.

But just as important: water history will have to cut across these temporalities, and move freely from one to the other. Water history will have to liberate itself from the sense of material necessity that often is associated with Braudel’s notions, simply because dramatic (water) events may change what constitutes the structure of *la longue durée*: a new dam upstream will fundamentally alter the lives of people downstream – ‘for ever’, and thus in a single event remove what constitutes the regularity and predictability of everyday life. Dramatic events in water flow or water control may not, however, coincide with similar events in the broader economic, cultural or political context. Expressed in a non-Braudelian way: when it comes to water, events may not only be of a passing importance but may also have a long-term, irreversible impact.

The history of water control is extremely varied in its technical complexity, its political and economic intentions, and its ecological and social impacts. Some water projects represent truly dramatic changes in history, e.g., the Hoover dam in the USA, the Aswan dam in Egypt and the Sudan, the Duke of Bridgewater canal in England or the Emperor canal in China. When implemented they changed the course of development in the locality and beyond. But mostly water control is an ordinary, everyday matter – repairing a ditch here and turning a tap there – practices repeated year after year and day after day, and thus re-enacting and confirming existing relationships to water.

All societies have in one way or another been forced to manage their water resources, and have been affected by how the waters run through their landscape and how they have adapted to it and controlled it. Consequently, the issue of water control brings into focus all the seminal questions of historical interpretation: the origin of food production, the establishment of the first cities, the riverain irrigation civilizations of the Middle East and Asia, and water as the main force of power during thousands of years, including the first phase of the industrial revolution.

Since water control is as old as human society, and water is a universal societal resource, water in itself – and societies' relations to it – are empirically fascinating and theoretically challenging. From time immemorial, man has tried to master nature by transforming and controlling the water running through the landscape. This volume illustrates how these efforts have dealt with flood control and disease control, dams and canals for irrigation, rivers for navigation, and the different ways of using water as a source of power. Dams have stored, regulated, and raised water. Watersheds have been reworked and linked. Rivers have been forced between levees and dykes, canalized, straightened and cemented. Water has been diverted from areas of water surplus to areas of water deficit. Lakes have been lowered and wetlands drained and the artificial river is definitely not a modern invention.<sup>2</sup>

## **THE FUTURE OF FRESH WATER IS THE FUTURE OF HUMANITY**

The continuing occurrence of vast floods, devastating droughts, and their aftermath, shows that despite 5,000 years of effort, humanity has yet to succeed totally in its attempts to control water. Some of the most impressive achievements in history have undoubtedly been linked to water control but to subjugate the ever-changing waters to the needs of mankind remains a daunting challenge, more so in

some regions than in others. The prospect of climate change will make water control an even more pressing issue across the world, since the solutions of the past may not work in the future. Global, regional and local changes in precipitation patterns and uncertainty about future climatic conditions will force societies to adapt to a new water reality, and they will undergo deep structural changes due to the combined impact of historical processes and the fundamental social importance and physical character of water. If the climate does change and, for example, glaciers in Himalaya, in the Alps or on Kilimanjaro are seriously diminished in size – as many scientists warn – societies may have to reorganize on a large scale in order to adapt to increasing water variability. The importance of the water landscape to all societies means that such uncertainty will demand changes to water infrastructure and water policies. The essential and structural role that water plays in society, even though at the same time it is fundamentally structured by society, implies that significant, and in some cases even minor, changes in the water landscape and in the water control system, may have profound impacts both on nature and on society. With water, the past definitely reveals itself in the future, and the future is embedded in the past.

In spite of the many efforts at water management around the globe, it is evident that many countries will face water shortages in the years to come. Governments and peoples will have to make tough choices to quell the thirst for water and to avoid water wars. In some *water-rich* countries, on the other hand, they have started to prepare for the end of the fossil fuels era. They argue that we are heading for the hydro-age, where water will replace oil and gas and thus solve both the energy crisis and the pollution problem. (The Altinget in Iceland, has decided that their country shall enter the hydro-age, and that everything on their island, from cars to factories, shall be driven by water.) But one trend seems to be shared by both water-poor and water-rich countries: the privatization drive in the water sector – one of the most fundamental transformative effects of the New Development Paradigm, and a redefinition of the relationship between state and society.

Future water control also includes dealing with water-borne disease, whether it be from bilharzia in Egypt or the West Nile virus in the United States. Already 2 billion people are reported by the United Nations to be without safe drinking water. Changes in temperature and rainfall will spread water-borne disease – and polluted and infected water will continue to haunt humanity in the decades ahead. Human interference has turned sacred rivers, such as the Bagmati in Nepal, into arteries of death and pollution. As they

gather to worship, millions upon millions of believers will come to realize that central religious rituals and practices connected to holy water are at stake.

The era of large-scale water control projects is not over, as many observers seem to believe and as many environmentalists hope. For China's leaders, for example, desperate water situations have made them resort to massive projects. The growing water scarcity of the North China plains and the sinking groundwater table that threatens the very existence of Beijing as a capital, have led them to revive a gigantic plan, first suggested by Mao Zedong in 1952. The project will take 5 per cent of the Yangtze's flow and pump it hundreds of kilometres to the water-thirsty cities and farmland of the north – as far as Inner Mongolia. Those who support the project say that it is better to relocate hundreds of thousands of people now, rather than face the prospect of having to move whole industrial cities and millions of people later.

In 2002 construction started on the eastern route, partly using the 1,800 kilometre canal built during the Yuan dynasty (1279–1368) from the south-eastern city of Hangzhou to Beijing. In the coming years more than US\$12 billion will be invested in the construction of the east and middle water-diversion routes, stretching for 2,400 kilometres. But even if this gigantic project succeeds, the national water crisis will not be solved: reducing China's water crisis will require an across-the-board effort to restructure all sectors of China's economy with water-efficiency as a priority – including raising the price of water to encourage efficient use, strengthening pollution controls to protect scarce water supplies, implementing water-saving measures and water harvesting on a large scale. The water shortage will become, and remain, a serious bottleneck both in the country's economy, and in securing a stable relationship between the state and the people. China's leaders are realizing that the most serious threat to their rule may not be a desire for Western-style democracy but a growing thirst for water.

On the African continent, in one of the most forbidding stretches of desert in the world – in Libya – another epic battle in the quest for more water continues. Beneath the baked crust of earth here, phenomenal supplies of water have been discovered. The Libyans drilled not only for oil but for water. They found a hidden underground pool the size of Germany, several hundred metres deep! The goal became to bring this water from the south-east and the south-west of the country to the shores of the Mediterranean, where most inhabitants of Libya live. The project is aptly called the Great Man Made River Project. One of the world's largest single construction projects is being implemented. Enormous pipelines will eventually

transport two million cubic metres of water a day, twice the flow of the River Thames in England. The network will extend about 3,380 kilometres. In the 1980s the Libyan leader, Colonel Ghadaffi, launched the Great Man Made River Project, nicknamed the 8th Wonder of the World. To create a river as long as the Rhine out of a finite resource must be one of the most striking examples of man taking control over water. But to tap these enormous aquifers is to tap the liquid legacy of a past climate. About 10,000 years ago the barren Sahara was a green savannah, where giraffes and elephants roamed. Heavy rains filled lakes and rivers and gradually formed groundwater basins. It is this old water that now will be consumed through the use of modern technology. The conquest of parts of the Sahara can be seen as an ultimate example of what is possible with new technology using water as a powerful tool.

The leaders of China and Libya are exploiting modern water transfer technology to its maximum. In countries with stronger democratic traditions and more environmental movements, such solutions stir social conflict, as can be seen in Spain over the project to divert waters from Ebro into the dry areas to the south of the country. But notwithstanding this, the age of the major water project is not over.

Mankind's ambitions in water control have never been greater than they are at present. Worldwide there are 45,000 dams greater than 15 metres in height, and 400,000 square kilometres are flooded by dammed water. Some 80 per cent of the Northern Hemisphere discharge is moderately or heavily regulated.<sup>3</sup> So much has already been done that, if at some future date archaeologists from another planet search through the remnants of this civilization, they may well conclude that the true temples of humanity were the large-scale water works. This 'assault' on the rivers has meant that water systems all over the world have lost their natural seasonal and annual rhythm: some of them operate on 'factory time', while others are subjected to the rhythm of irrigated agriculture or even tourism. The global development in the twentieth century represents one of the most fundamental changes in the relationship between water and society ever, whose implications we do not yet properly understand. Therefore, many of the essays in this book deal with topics from this last century when the relationship between human societies and their water environment changed radically.

## **THE 'TRADITION' AND WATER HISTORY**

In order to improve our understanding of the role of water in history



and development it is necessary to break away from dominant traditions within the social sciences. Nature, or the nature of water, has often been overlooked or discarded as a topic of research relevance; or to be more precise, it is a topic which the mainstream social sciences seem to have had difficulties in understanding and dealing with, unless it has been reduced to or treated as a social issue.

The dominant tradition can be traced to the ‘father of sociology’ and one of the most influential thinkers in the establishment of social science: Emile Durkheim (1858–1917). He underlined very clearly what the task of the social scientist should be: ‘a social fact’ could and should be explained by another social fact. Only based on this dichotomy between ‘nature’ and ‘society’ could sociology as a distinct, autonomous discipline develop.<sup>4</sup> It was social facts, and definitely not the river as physical nature or as an historical agent of its own, that should be the object of study for social scientists:

These ways of thinking should not be confused with biological phenomena, since they consist of representations and of actions; nor with psychological phenomena, which exist only in the individual consciousness and through it. They constitute, thus, a new variety of phenomena; and it is to them exclusively that the term ‘social’ ought to be applied.<sup>5</sup>

This conceptualization of the nature/society divide and the subsequent delineation of the research object of social scientists was strengthened by highly influential theories of history and modernity of the last two hundred years: historical development has been regarded as a process by which mankind is liberated from nature or from the powers of nature. Nature has also been understood as the opposite to freedom, and human domination of it as a criterion of development and a step in the process of liberation. The separation of nature from society was one prerequisite for regarding nature instrumentally, as a set of passive objects to be exploited. Typical of this tradition is Karl Marx’s statement: ‘Capitalism liberated man from the traditional, localised dependency of nature, and with it the “nature idolatry” this relationship was associated with. It was no longer “nature” that fettered the human being; it was capitalism that did that.’ In *Grundrisse* he wrote:

For the first time, nature becomes purely an object for humankind, purely a matter of utility; ceases to be recognised as a power for itself, and the theoretical discovery of its autonomous laws appears merely as a ruse so as to subjugate it under human needs, whether as an object of consumption or as a means of production.<sup>6</sup>

Similar notions are also reflected in different modernization theories, from those suggested by British thinkers and philosophers in the early nineteenth century to the post-Second World War theories of a universal development process in stages as promoted by the United Nations, rendering largely irrelevant and potentially damaging, studies entailing how particular water landscapes have affected societies and their development patterns and options differently. The water landscapes of Jordan and Norway, China and England, or India and Mali, have obviously in fundamental ways impacted these countries' development processes, so much so that development theories with universal ambitions can be seriously questioned.

Given the dominant evolutionary schemata for historical development it is unsurprising that interest in how societies have been influenced by nature has been relegated to the background. One anomaly in Marx's historical materialistic theory of history, the notion of 'the Asiatic mode of production', was heavily influenced by rather mechanistic ideas of how waterscapes can affect societal formations over long periods of time. Perhaps because of the place it gave nature in explaining social forms it remained an anomaly, and nature/society relations, typically for his time, did not enter into his broader conceptual framework. This perspective has encouraged a rather sterile, narrowly defined discussion about whether the subject (human agent) or object (society or social institutions) should be regarded as having primacy, while the object of nature is left out.<sup>7</sup> The conventional consensus perspective has generally been that theoretical and empirical analyses can be based on the assumption that societies are persistent, cohesive, stable, generally integrated wholes, differentiated by their cultural and social-structural arrangements.<sup>8</sup> In this framework it becomes relatively irrelevant to study relations between physical structures and social organization.

Similarly, in an influential book by the sociologist, Anthony Giddens, sociology is defined as 'the study of human social life, groups and societies',<sup>9</sup> and the aim is to understand the 'subtle, yet complex and profound, ways in which our lives reflect the contexts of our social experience...Sociology focuses in particular upon social life in the modern world – the world brought into being by the sweeping changes in human societies which have occurred over the past two centuries or so.'<sup>10</sup>

Modernity is summarized by explicitly relegating nature, and consequently the water landscape, to a place outside his picture of what is to be explained:

Conditions of life for previous generations were always insecure: people were at the mercy of natural disasters, plagues and famines. In the industrialized countries today we are largely immune from these insecurities; our uncertainties about the future derive from the social forces we ourselves have unleashed.<sup>11</sup>

Structures are not, and cannot, in this way of reasoning, be linked to nature or waterscapes, but are the semantic and normative rules and power resources that, as abstract properties of communities, are used by social actors to produce the skilled performances which constitute social life. Through their use in social practice, structures are reproduced as features of social communities, so that structures (as reproduced practices) are the outcome of practical activity. It is these rules and resources enabling and constraining action that are themselves constituted by action. This structuration theory is concerned with 'recurrent social practices and their transformations'<sup>12</sup> Giddens also argues that 'human agency is bounded, human beings produce society but they do so as historically located actors, and not under conditions of their own choosing'.<sup>13</sup> Structurated systems – and action there – do not really exist in time and space but bind time and space.

The constructivist post-modern tradition is an extreme variant of this view: nature itself has had no influence on the development of natural science. The epistemological status or the 'real existence' of the phenomena being studied is of no interest. Whether one explanation is better than the other is irrelevant, since nature is socially constructed anyway, and science is no more factual than non-science.<sup>14</sup> Constructionists are obscuring the difference between 'constituting reality' and 'constituting our accounts of reality' and between controlling nature and excluding nature. The constructionists have constructed the theory of nature as social construction, arguing that such constructions reflect vested interests and contingencies that the actors themselves do not necessarily understand. The dynamism of water (or nature in general) is consequently brought and concealed under the cover of social action, and the reality of water, of river hydrology, of precipitation patterns, does not in reality exist.

On the opposite side one can find Karl Wittfogel, a German-born social scientist who was strongly influenced by the debate on Marxism in Germany in the 1920s.<sup>15</sup> He argued that the origins of despotic government are to be found in the great river valleys and caused by the implementation of large-scale irrigation works; and that this created what can be called a distinctive Asiatic mode of production, a developmental stage that appeared, but was not, as

indicated above, developed in Marx's writing. In the 1920s different positions developed between a kind of determinist Marxist geopolitics and an anthropocentric version of Marxism that denied nature any sort of independent status. Wittfogel aimed at developing a theory of history that gave nature a central place within a broad framework of development-orientated, historical materialism. Thirty years later he published *Oriental Despotism: a Comparative Study of Total Power* (1957). Here he developed a somewhat reductionist and radical mechanical theory that not only ascribes the water landscape a role in historical development but also gives it a decisive role in determining social institutions and even political forms of authority. He talked about 'hydraulic government',<sup>16</sup> and 'hydraulic agriculture'.<sup>17</sup> Water control on a large scale made the state much stronger than society, and that 'prevents the nongovernmental forces of society from crystallizing into independent bodies strong enough to counterbalance and control the political machine'.<sup>18</sup>

Wittfogel aroused much criticism, including accusations of looseness of terminology and definition, and the establishment of hypotheses incapable of falsification. It has been argued that China has no concrete landscape and no concrete historical period that can be pointed to as a credible illustration of anything approaching the pure type and mechanism of 'oriental despotism',<sup>19</sup> and that irrigation is far too broad a rubric to have precise heuristic value. Wittfogel defended his position by arguing that economic and political institutions, like all others, develop on definite geographical foundations, and that they function within a specific territorial framework; they grow and change within a physical environment whose influence is determined by the society's historical level, structure and trends. It is possible to argue that what Wittfogel has done is to state a rather sophisticated probabilistic or challenge-and-response position: historical conditions being equal, a major natural difference may be the possible cause of decisive institutional difference. The objective structure of a particular water landscape may determine not only the productive activity but also its direction by providing both raw materials and a market outlet, and often more importantly, natural forces of production. The water environment can create conditions for a definite but multilinear social development process.

Historians and other social scientists have long been reluctant to analyse relationships between water landscapes and social organization. But perhaps the most important criticism of Wittfogel, and in line with the emphasis this volume gives to specific hydrological conditions, is the fact that he failed to explore all the different and varying physical and hydrological aspects of the rivers and

water systems which his historical actors related to. His geographical archetype was drawn from the big rivers of Asia, but this 'river' did not resemble the water systems of Sri Lanka, of Iraq and perhaps not even of Egypt, and indeed not many of the water bodies explored in this book.

## WATER NARRATIVES

During the 1990s historians, influenced by environmental concern and development pessimism, wrote stories about what might be called 'Histories of the Dead River', i.e. stories about how humans negatively affected the vulnerable waterscape. Typical titles were: *A River No More: the Colorado River and the West* (Fradkin, 1984) or *A River Lost: the Life and Death of the Columbia* (Harden, 1996), or *River of Sorrow: Environment and Social Control in Riparian North India 1770–1994* (Hill, 1997).<sup>20</sup> A different perspective emphasized harnessed rivers as 'The Conquered River' and was concerned with how control of rivers also meant social domination of some people over others – see, for instance, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (Worster, 1985). Worster wrote:

Here, then, is the true West, which we see reflected in the waters of the modern irrigation ditch. It is, first and most basically, a culture and society built on, and absolutely dependent on, a sharply alienating, intensely managerial relationship with nature. [...] Quite simply, the modern canal, unlike a river is not an ecosystem. It is simplified, abstracted Water, rigidly separated from the earth and firmly directed to raise food, fill pipes, and make money.<sup>21</sup>

In environmental history during the 1990s, the discussions were concerned with dissolving the dichotomy of culture and nature. The most important of the works taking a post-modern approach to the harnessed river is perhaps Richard White's, *The Organic Machine: the Remaking of the Columbia River*.<sup>22</sup> White's arguments can be compared with Blaine Harden's *A River Lost: the Life and Death of the Columbia*, published a year later, analysing the same river and the same history but interpreting it in a very different way. Harden's narration of the Columbia is a history of destruction: 'It has been raised, fattened, and slowed.' The Dead River is reduced to pure technology: 'The river was killed more than sixty years ago and was reborn as plumbing.' It has been transformed to an 'electricity-irrigation-transportation machine'. To Harden nothing is to be found in the Columbia that is not man-made: 'There are no rapids at all,

nor are there waterfalls, riffles, eddies, sinkholes, or a single “agitated gut”: The Columbia does not flow, it is operated.’ Richard White, on the other hand, states that nature is simultaneously a cultural construction and something outside man. Nature is the spawning salmon as well as man catching the salmon. White argues that by stressing that canals and dams are part of the river one can maintain that there is no border between man and nature. The river is just a flow of energy. Even in its highest stages of development the river ‘remained a natural system with a logic of its own’ – a logic not controllable by man. White defines the Columbia as an organic machine; though altered by man it retains its natural qualities. Water within this perspective tends to become passive and inanimate, understood as something which exists only as far as humans conceive it to exist. Other studies combined an interest in both how rivers have been conceptualized and become subject of a particular river discourse, and how rivers as actors in their own right affect societies and economies.<sup>23</sup> The chapters of this book share an understanding that fresh water is both an actor in its own right and that at the same time it is impossible to access this reality except through cultural and social lenses.

Control of water is, and always has been, based on cultural constructions of water, whilst at the same time it carries in itself values or ideologies. Dams, the classical symbols of water control, and as such also the symbols for different types of political capital and moral authority, have ideological connotations and signify particular development policies. However, large-scale water projects have also ended up as symbols of failure, in ancient times as well as in ours. It is important to study both the unnatural and natural history of water disasters, since not only will floods vary and have different causes and consequences but fundamental concepts like flood, drought, water shortage and water conflicts have different meanings and connotations in different physical and social settings. The Chinese have an age-old saying that nicely sums up the long but unending story of man-water relations: ‘Man always aspires higher but water flows to the lowest point.’

## **NARCISSUS REVISITED**

This volume aims to encourage research into water history. This history is not only rich in itself but also makes it possible to throw new light on a number of important historical questions, from the first river civilizations to the present day, whether one investigates this complex and fascinating history as unfolded in the slow rhythm of *la longue*

*durée* or in the abrupt changes caused by catastrophic events. As the research field develops it will be a source of wisdom for the understanding of historical developments at large. Faced with the future water situation, there is, especially, one important lesson that can be learnt from this volume: there are no quick fixes to the water problem. That is one reason why this volume presents a number of narratives from a wide range of water situations: to emphasize the need for the historical, concrete, empirical knowledge that water management must be based on if it is to improve, and be able to meet the challenges facing societies in the future.

Some 2,500 years ago the Greek philosopher Heraclitus (540–480 BC) said that one could never step into the same river twice. Heraclitus's ideas are also summed up in the famous words, 'Everything is in motion', or 'All is in flux'. What he meant by these sayings was that, although it is tempting to identify a river in terms of its water, it is hardly advisable. If one does, then one has to accept the consequence: that the river which a year ago (or even yesterday for that matter), one called the Thames or the Nile, simply does not exist any longer. Or rather, it is now mingled with the waters of the North Sea or the Mediterranean. It has therefore become something other than it was. The river that one can see or step into one year, or today, transforms itself into something partially or wholly new, simply because, depending on the rate of flow and the river's length, the water has been wholly or partially replaced by other water. Hence the river cannot be equated with its water. Heraclitus believed that the river needs to be conceptualized in another way. It is impossible to touch the river. One can only touch the river's water. The river therefore has permanence as a process, but not as some specific substance or substantial object. Similarly, the rain that falls on the various societies of the earth is constantly being changed and is never the same. This volume presents a number of essays which, taken together, demonstrate that the movement of water in the landscape and in society is not just enduring but is an 'eternal' phenomenon which has constantly created and re-created certain and very varying possibilities for social organization and has constantly been influenced by human action.

The chapters on the importance of water and water control in this volume can be seen in the light of a re-interpretation of the Greek myth of Narcissus. The gods punished Narcissus by making him fall in love with his own reflection. On looking into the water he saw his own face looking back at him; he saw only his reflection. In other words, he did not notice the water that made his reflection possible until he fell into it and drowned. For Narcissus neither water nor nature existed independently and in its own right, separate from his

idea of it. He did not see the water and was blind to its significance, even if – or perhaps precisely because – he was so familiar with it. He was, after all, the son of the river god, Cephissus, and the water nymph, Leiriope. Narcissus can be seen as a symbol of, on the one hand, a civilization's self-centredness but, on the other, of the intellectual tradition which has long dominated social science, a tradition which overlooks the boundaries and properties of nature – and of water – and the dynamic interface with society.

Many things can be recaptured and relocated in the general framework of a water history, so that despite all the differences, paradoxes and contradictions in time and amongst societies, it may be possible to discover a unity of history that is not a universal history but a unity of life. A book with narratives of water control from all over the world can give a vivid sense of a human past that in certain aspects can be seen as fundamentally shared. While there may be nothing that appropriately can be called universal values, water control is definitely a universal predicament. Water control in one form or another is one thing which all people at all times have had and will always have in common, and they will forever have to adapt to, and to control, the water that runs through their societies.

## NOTES

1. The concept and study of *la longue durée* as a historical form is connected to Fernand Braudel, Emmanuel Le Roy Ladurie, and other historians of the *Annales* school. See Le Goff, J. (1992), *History and Memory*, translated by Steven Rendell and Elizabeth Claman, New York: Columbia University Press, pp. xxi–iii.
2. The well-known Chinese creation legend tells that the mythical Emperor Yu managed to tame the waters and thus created the World. On Sri Lanka the irrigation network formed the basis for a thriving economy with a large agricultural surplus that sustained a vibrant civilization for centuries. Close to Polonnaruwa, one can still see one of the largest and most spectacular ancient tanks, the Parakra Samudra, the sea of Parakrama, built by Parakramabahu I (1153–86).
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4. Durkheim, E. (1904), *The Rules of Sociological Method* (New York: Free Press, 3rd edn, 1966), p. 145.
5. Durkheim, op. cit., p. 34.
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18. Wittfogel, op. cit., p. 49.
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21. Worster, D. (1985), *Rivers of Empire: Water, Aridity, and the Growth of the American West* (New York: Pantheon Books), p. 5.
22. White, R. (1995), *The Organic Machine: the Remaking of the Columbia River* (New York: Hill and Wang).
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