1 Water in the Age of Imperialism – and Beyond

D. Worster

In the spring of 1998, just before the devastating floods of that year, I floated down the great Yangtze River of China on a local tourist boat. The Yangtze, or the Changjiang, is one of the three longest rivers in the world and one of the three most voluminous. Its average discharge into the China Sea is some 35,000 cubic metres per second, a rate that at times it has far exceeded. Much of that flow is silt. Already, at the river port of Chongqing, where we boarded our boat, the river was thick with mud, the residue of soil erosion, as well as chemical pollutants; it became more turbid and polluted as it swept down 500 kilometres to Yichang, where we left the river.

I travelled by this slow, indigenous mode to see the fabled Three Gorges before they are inundated by a massive dam project that is being completed near Yichang. I wanted to see the green hills rising on both sides of the river, planted with corn and soybeans, the threatened hillside towns along the way (many of them now emptied), the construction site itself (a thrown-together camp of 50,000 workers).

This massive work of hydraulic engineering, the largest and most controversial in the world, is an example of modern environmental imperialism. But behind it stretches 2,000 years of Chinese history, a persistent set of attitudes about water and its control long antedating the present communist regime. Relative to the state of wealth and technological development, the new dam may not even be the greatest project in China's long conquest of nature.

In the fourth volume of his magisterial work, *Science and Civilisation in China*, the Cambridge University historian Joseph Needham declared: 'The story of the hydraulic works of China is nothing short of an epic'. To him they were the technological heart of China's civilisation, a glorious past full of promise for the future. Before the nineteenth century, he argues, no country, no empire

anywhere, could match China's ability to control and manage its surface water.[1]

It is common knowledge that, despite such technological triumphs over nature, China eventually fell victim to invaders from Europe and Japan and into a slough of poverty and malnutrition that finally brought on the Revolution of 1949. Water control alone was not sufficient to keep the empire safe from its enemies or to keep good order and a submissive populace. Yet until the twentieth century no other people could show such impressive achievements in hydraulic engineering. And no other empire throughout human history has endured so long and tenaciously as China. The foundation of that empire, it bears repeating, was the control of water.[2]

For an American contemplating his own national history, China's record of water engineering offers striking parallels. I cannot think of another country in the world that compares so fully with my own in scale of water engineering or grandeur of water ambitions. For the US is also an empire built on water.

I first began to discover this intertwined story of water and imperialism when I began to look into the history of the arid West. Through most of American history the West was assumed to be a place set apart from the rest of the nation, even from the world – a better, more hopeful, more innocent place. To go west was to leave the Old World far behind, with its corrupt systems of power and wealth, its empires and dynasties.

But I soon realised that, in water as in so many other aspects, the western region of the US had written a history that, in broad outlines, was similar to history written elsewhere. Going west, I discovered, meant taking passage to China, India, Egypt and ancient Mesopotamia – back all the way to the valleys of the Tigris and Euphrates, back to the rise of Sumerian civilisation.

Halfway across the Great Plains the annual rainfall falls below 20 inches (or 50 centimetres), the minimum needed to raise the major food crops. A century and a half ago that aridity seemed to defy much human settlement, let alone empire. Despite many private efforts to seize the available water and transform the desert into a garden, disappointment was the biggest crop. By the late nineteenth century the would-be conquerors had given up on private enterprise and were demanding that the federal government use its substantial capital, power and expertise to take command of western rivers and subordinate them to the cause of irrigation.

In 1902, with the passage of the National Reclamation Act, the conquest of water in the arid West became an official project of the government. Often celebrated by historians as a noble expression of democratic ideals, that act was supposed to provide water for

millions of new settlers. But the true motivations had darker tones. First, the act owed its passage to the clamour of expansionary industrial capitalism for new markets. 'The wealth which would be added to the nation is beyond calculation', declared a congressman in debate over the legislation; 'better that we spend our hundreds of millions of dollars in the creation of this new world within our borders than squander it beyond the seas'. Eventually, Americans would also look beyond their borders for economic expansion, but first they looked toward the vast, undeveloped and largely arid part of the continent. Second, the act was aimed at preventing violent revolution in America's streets. The control of water, promised another congressman, would be 'better than a standing army'. In opening land for settlement, hydraulic engineering would serve as a safety valve for the discontented, unemployed and unruly mobs of the eastern cities.

Americans of the nineteenth century were often reluctant to call themselves imperialists. For a long time after their breakaway from the British Empire, they denied that they had any Old World ambitions of establishing rule over subject peoples living in faraway lands, though the takeover of Mexican territory and the dispossession of Native Americans were unmistakably imperialist deeds. Yet while they denied their empire-building ambitions, Americans did boldly put the word 'empire' all over their map, starting with the Empire State of New York and moving west to the Rocky Mountain Empire, centred on the city of Denver, the Inland Empire of the interior Pacific Northwest, and the Imperial Valley of southern California.

More than they wanted to admit, Americans began to follow the pathway that Imperial China had established centuries earlier, and they became part of the new Age of Imperialism, an age that reached its peak of intensity in the years 1870–1914.

The Age of Imperialism in modern history was the invention of the major European powers – mainly Great Britain, France, Belgium and the Netherlands. In each of those countries imperialists sought to expand industrial capitalism and its markets, just as the Americans sought to do. European imperialists anticipated the Americans too when they responded to fears of running out of room at home, of social unrest brewing, of needing an outlet, or what the Germans called *Torschlusspanik*, or fear of the closing door.

By 1878 the European nations controlled 67 per cent of the world's land surface – by 1914, 84 per cent. The causes of that extraordinary expansion of power are multiple, involving both motives and means. Put most simply, the Europeans *wanted* to dominate the earth and, at the same time that motive appeared, they acquired the technological means to do so. Some of that domination was exercised through

settler societies (the 'white dominions' of Australia and Canada), while in other places – Asia and Africa – they exercised power over indigenous peoples. In still other places their power was less one of direct rule and more one of economic influence.

Interpretations of the Age of Imperialism have gone through a significant shift during recent decades. Not so long ago historians emphasised the grand strategic thinking and the benevolent motives of European political elites, taking for granted the imperialists' claim that they were the bringers of progress and enlightenment to the world's masses. But then arose a 'new' history, as Michael Adas has explained, which threw light on the deeper and more self-serving motives animating the imperialists. Imperial history became more critical, less Eurocentric. Historians are now much more interested in the fate of the colonised than in the dreams of the colonisers, in the resistance of subalterns, and in the impact of exported European institutions and attitudes on the world's gender and race relations.

With rare exceptions, though, the new historians of imperialism have tended to ignore the environmental dimensions. They have ignored the fact that imperialism has aimed at the conquest of nature, with profound ecological as well as social consequences.[3] Michael Adas is an exception to that generalisation. He has written that

> the ideology of imperialism in the age of European global hegemony was grounded in the demonstrated material superiority of the Europeans; a superiority evinced by the mastery of nature they had gained through their scientific discoveries and the power that their technological advancement gave them to wage war, conquer time and space, and tap hitherto unknown or scarcely used resources of the earth.[4]

Similarly, Daniel Headrick has pointed out, in his book *The Tools of Empire*, that technological advances 'made imperialism happen, both as they enabled motives to produce events, and as they enhanced the motives themselves'. Among the most important of those technological advances were those of hydraulic engineering, including canals, head-works and dams. To a larger degree than we have yet realised, European imperialism rested on transferring that hydraulic engineering and water-controlling apparatus to the rest of the world – spreading 'the tools of empire'. That environmental impact continued after the Europeans returned home, leaving behind them in country after country a new fascination with machinery, innovation and the conquest of nature. 'This', writes Headrick, 'has been the true legacy of imperialism'.[5]

India may be taken as the classic example of this project of establishing European power through the command of nature. India was the most glittering jewel in the British imperial crown, and indeed the most important colony in the world. Having covered England and Scotland with canals for the purpose of transportation, the British imperialists came to India intending to make water run in the directions that were most useful to them.[6] In India, however, they discovered that the great need was not canals to carry barges but canals to bring water to dry lands and to extend cultivation. India already had a few such structures, drawing water from the Himalayas and spreading it over the low, hot valleys for irrigation. Some works had been built centuries ago but had fallen into disrepair and in many places were covered with jungle. In 1830 the British engineers tackled the rehabilitation of the Jumna canals. Six years later they began to make a massive new canal of their own up on the Roorkee plateau between the Jumna and the Ganges rivers – the world-famous Ganges Canal, 10 feet deep, 170 feet wide, 900 miles long, designed to irrigate almost 600,000 hectares. The Ganges Canal opened in 1854 and proved to be a fabulous technical success. By the twentieth century it was feeding 2.5 million people and returning nearly 12 per cent a year on the cost of its construction.

The success of those canals depended, of course, on the flow of India's rivers, which in turn depended on the monsoon, the snow pack in the mountains and the summer runoff. Eventually British engineers learned how to store water as well as draw it off by building barrages and dams on the main river courses and near the headwaters. With such works they could irrigate lands like the Sind and the Punjab, where agriculture was otherwise impossible, and the Gangetic plain and much of the Deccan, both vulnerable regions where sometimes the rainfall was adequate and sometimes not, causing frequent crop failures, famines and social unrest. Water-control projects became a means of pacifying a volatile country; control the water and you control the people, who in times of drought might grow hungry and mutiny against the empire.

Even after they threw off their rulers, the Indians would not return to their old relation with water. Richard Baird Smith, one of the leading hydraulic experts of the nineteenth century, correctly predicted that the canals and dams were 'more likely, from their relations to the material prosperity of the country, and from their permanent nature, to perpetuate the memory of English dominion in India than any others hitherto executed'.[7]

Those triumphs in South Asia were not lost on the rest of the world. Thousands of miles away, the Americans were paying close attention to the British example. Beginning in the 1870s they began

making pilgrimages to the Ganges Canal and other hydraulic works of India and Egypt to discover exactly how the conquest of water might be carried out. As one of those pilgrims, George Davidson of California, put it, 'India affords us the most conspicuous examples of irrigation on a grand scale, and it is here more than anywhere else in the world that a great systematic scheme is in progress of development'.[8]

It was not long before the US could boast that it too was capable of a vast conquest of water. In 1902 Congress committed itself to transforming the western desert by passing the National Reclamation Act. In 1906 the Americans took over a failed imperial project of the French to construct a waterway across the Isthmus of Panama. Completed in 1914, at a cost of over $300 million, the Panama Canal became a vital conduit of trade, profit and military might. Then, using some of the techniques perfected in Panama, in 1935 the US dedicated the highest concrete river structure in the world, Hoover Dam on the Colorado.

During the ensuing decades, from the mid-1930s to the mid-1960s, the federal government managed to turn every major river in the arid West into a series of man-made lakes, building thousands of dams and reservoirs generating hydropower, agricultural crops and urban growth. Those technological achievements explain more than any other factor how and why the American West became an economic powerhouse globally, a magnet for massive immigration and one of the most urbanised and engineered landscapes anywhere.

Here, then, in the twentieth-century American West, following the inspiration of nineteenth-century British India, the conquest of water reached its highest all-round standard of technical achievement. Like other imperial powers, the US could boast a talented cadre of scientists and engineers who designed the technology and made it run efficiently. Despite many misgivings, the West had entrusted itself to a strong central government that would invest vast public monies without worrying about a quick return, or even about achieving a balance between costs and benefits. And the region had attracted a class of progressive, entrepreneurial agriculturists eager to make use of that investment. Call the whole composite the 'holy trinity' of modern water development – an alliance of science, state and capital. By the Second World War they were a more or less stable, happy alliance, not agreed on every particular to be sure, but united by a common vision of turning the rivers of the West into personal wealth and national power. It was an alliance designed to achieve an empire over water unlike anything seen before.[9]

It will not surprise anyone if I say that during the course of the twentieth century the dominant force in the Age of Imperialism

became the United States. After the Second World War the US not only assumed the role of superpower, but also took over the work of spreading the conquest of water to the ends of the earth.

In 1949 Harry S. Truman, at his inauguration as President of the United States, announced that the US was now ready to move beyond its own borders to bring progress to anyone and everyone:

> We must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas. The old imperialism – exploitation for foreign profit – has no place in our plans. What we envisage is a program of development based on the concepts of democratic fair dealing.

Truman was specifically proposing his famous Point Four programme that would extend technical and economic aid to the so-called 'underdeveloped' countries in the Southern Hemisphere. A strong supporter of western water control projects (the government had appropriated $230 million for reclamation work that same year), Truman undoubtedly had in mind the exporting of many Hoover dams to other countries. Perhaps this was not the 'old imperialism', as he claimed, but it certainly was some kind of imperialism.

Around that same time Truman's commissioner of reclamation, Michael Straus, described the control of water 'as a prerequisite of all development and elevation of living standards' and boasted that 'the American concept of comprehensive river basin development... has seized the world imagination. Yellow, black, and white men of various religions in all manner of garb are seeking to emulate the American pattern of development'.[10]

Truman's inaugural address may be the first time the word 'underdeveloped' appeared in public discussion, suggesting that there must be a single ideal way of life that all nations aspire to, an ideal defined, of course, by Euro-Americans.[11] What is most striking is the extent to which leaders in underdeveloped nations accepted that label. They were indeed underdeveloped, many admitted, and nowhere more so than in the utilisation of the rivers that flowed through the lands. But with help from the United States and other 'developed' countries they would overcome that inferiority. They understood, furthermore, that they would have to command the natural world to do so, and that such command would require creating their own alliances of science, state and capital.

Every part of the globe offered possibilities, but above all it was Africa that beckoned. Prior to the Second World War the European powers had done little to develop Africa's water resources, except

in the lower Nile valley. Despite being one of the most arid continents, it had great rivers flowing down from the highlands and past dense lowland populations, wasting water and energy in the sea. Estimates of Africa's total water resources vary from 3.5 to 4.6 billion cubic metres, a little less than half of that contained in rivers and lakes, the rest in underground aquifers. At the time of Truman's inauguration, Africa could boast 30 per cent of the world's hydroelectric potential, but virtually none of it had been exploited. South of the Sahara Desert it was irrigating less than 1 per cent of its cultivable land, and all of that by native, small-scale technologies.

Great possibilities abounded then, and in the late 1950s and early 1960s, faced with explosive human fertility and growing urban demand, Africa's leaders began to seek the aid of the Americans, Russians and west Europeans, along with such international agencies as the World Bank and the Food and Agriculture Organisation, to take command of the waters. They were as bedazzled by the vision of a high dam rising in their country as Americans in the arid West had been.

The High Aswan Dam of Egypt has been the most discussed project completed over the past four decades in Africa, but it has had plenty of companions on the roster of megatechnic marvels. The still uncompleted Jonglei Canal, designed to capture the Nile before it loses itself in the swamplands of the Sudan, is on that list, as is the Akosombo Dam, built in the 1960s in Ghana under the presidency of Nkwame Nkrumah, creating a lake that drowned 5 per cent of his country. In southern Africa the Kariba Dam and the Cabora Bassa Dam, both on the Zambezi, have become powerful symbols of the conquest, and so are the grandiose Transaqua scheme, though still a blueprint, to divert the Zaire River northward to water the Sahel, and Colonel Quaddafi's Great Man-made River Project, which, at a cost of $25 billion, is pumping fossil water from beneath the Sahara and sending it north to irrigate the Libyan coast. Clearly, from the ambitious size of these projects it would seem that Africa is more than ready to match the faith in technology shown in the American West.[12]

Imperialist historians tell us that during the past half-century the Age of Imperialism broke down and an Age of Independence succeeded. We talk about post-imperial history, post-colonial discourse and post-Eurocentrism. Yet when we look at the rivers of the world, imperialism seems more alive than ever. Imperialism as a political relationship may have come under fire, and dozens of nations may have declared their formal independence from outside control. But imperialism continues in other forms: in the subtle influence of ideas, in the export of technology, in the power of economic centres, and not least in the human relationship to nature.

To be sure, the backlash against the age of imperialism, those demands for decolonisation, has changed, to some extent, the way that water is regarded. Critical voices have emerged to challenge the drive of the science–state–capital alliance to gain power over every watershed on earth.

We can detect that more critical tone around the year 1970, and even more emphatically after 1980. Suddenly it became more difficult to launch new water projects in many countries. Citizens began demanding the preservation of remaining wild and scenic rivers. They raised questions about the economic benefits of large-scale hydraulic engineering, and about who received those benefits. People became more aware that imperial water was more often than not water diverted away from traditional agrarian users: Hispanic farmers or Native Americans in North America; village farmers in other parts of the world.[13] Imperial water, it seemed, flowed mainly to agribusiness, to state-favoured development projects, or to urban centres.

Since gaining independence in 1947, India has built more than a thousand new dams, until today it has more such structures than any other country. Yet the promised grain yields have frequently not materialised. Reservoir projects have destroyed forests and wildlife, increased evaporation and dried up village wells that depend on underground replenishment. More than 20,000 villages now have no local drinking water. At the same time, ironically, many areas have become waterlogged for lack of proper drainage of their irrigated fields, while salt deposits caused by improper irrigation have poisoned others. Silt washing from deforested hillsides has collected behind dams, lowering their storage capacity; the Sriram Sagar Dam in Andhra Pradesh, completed in 1970, lost a third of its capacity in two years because of silt building up on the reservoir bottom. Water development projects have displaced people as well as soil – as many as two million locals a year – and often they have been resettled, if at all, on smaller parcels of land that cannot be cultivated.

To bring India's water imperialists, foreign or indigenous, to an accounting is the aim of a younger, more critical generation, many of which are admirers of Mahatma Gandhi. Prominent among them is Vandana Shiva, a physicist turned environmentalist, who writes in one of her recent books: 'The temples of India, dedicated to the river goddesses, were substituted by dams, the temples of modern India, dedicated to capitalist farmers and industrialists, built and managed by engineers trained in patriarchal, western paradigms of water management'.[14]

The same critical mood has affected the United States. In 1994 the Commissioner of the Bureau of Reclamation, Daniel Beard,

declared, 'the dam building era in the United States is now over. The opportunity for any future projects is extremely remote, if not nonexistent'. Not 40 years earlier, Beard's bureau had promised that they would soon achieve 'total control' over western rivers. Now, we are told, no more dams.

Note carefully, however, that Commissioner Beard did not claim that the entire hydraulic system would disappear – that Americans would no longer manage rivers, control floods, channel streams or irrigate dry lands. Nonetheless, the commissioner spoke words that thrilled many environmentalists, who have grown increasingly critical of the old imperial attitudes.

Now we have begun to hear from some environmentalists even more radical thoughts about water and its uses. Perhaps the boldest challenges to water imperialism come from those who want to begin tearing down existing dams. They would add to Commissioner Beard's words the declaration 'and now the dam-*removal* era has begun'. Mostly they are talking about aging dams that would cost more to repair than remove. One target that is not so very old, however, stands at the top of their list: Glen Canyon Dam on the Colorado, completed in 1963, drowning nearly 200 miles of sculpted canyons under the slack waters of Lake Powell. As incredible as it would have seemed in the 1930s or even the 1960s, little knots of people are asking that Glen Canyon Dam, a leading icon of 'economic development and scientific progress', be knocked down and the Colorado River restored to its ancient course.

There is no predicting what will come of these radical thoughts. New ideas about nature do now and then sweep through a society, altering its ecology and technology. This may be one of those unpredictable waves of thought that will reach astonishing proportions.

As a historian, I feel the powerful hand of the imperial past still lying on the present, preventing radical change. I see across the United States nearly a hundred thousand dams, small and large, still standing. I see entrenched interests and firmly rooted attitudes of conquest. I see growing populations that demand more and more from the environment. I see too that empires over nature, perhaps even more than empires in a strictly political sense, can have exceptionally long lives. They are not easy to overthrow or abolish. I wonder whether China's example of successive dynasties may prove relevant to the US and other countries.

On the other hand, for the first time in history there is a broad critical spirit rising against imperialism in general, and against water imperialism in particular. It is spreading from country to country, and wherever it goes, it seems to be making the same demand: Stop

massive interventions in the waterscape. Look for ways that people can live less obtrusively, more harmoniously with their riverine systems. Develop more democratic forms of decision-making about rivers and watersheds.

Are we then moving into a new, unprecedented era in the world's environmental history, where the old water imperialism of the past century or two will be abandoned and where new post-imperial attitudes and behaviours will take their place? Are we more likely to be trapped in the legacy of imperialism – its impact on the land and water, as well as on cultures and societies, both conquerors and conquered? Asking such a question moves us beyond history and into the realm of prophecy.

NOTES

1. Joseph Needham, *Science and Civilisation in China* (Cambridge: Cambridge University Press, 1954), vol. 4.
2. Mark Elvin, 'Preface', *The Retreat of the Elephants* (in manuscript); J. R. McNeill, 'China's Environmental History in World Perspective', in *Sediments of Time: Environment and Society in Chinese History*, eds Mark Elvin and Liu Ts'ui-jung (New York: Cambridge University Press, 1998), 31–52. On the Sanmenxia Dam, which will flood the Three Gorges, see Judith Shapiro, *Mao's War Against Nature: Politics and the Environment in Revolutionary China* (New York: Cambridge University Press, 2001), 50–55.
3. See, for example, Denis Judd, *Empire: The British Imperial Experience from 1765 to the Present* (New York: Basic Books, 1996), which contains no references to water, irrigation, agriculture, land use, ecology or conservation. Robin Winks has noted that environmental history 'has, as yet, had relatively little impact on Imperial Studies in general', in 'The Future of Imperial History', *The Oxford History of the British Empire: Vol. V: Historiography*, ed. William Roger Louis (Oxford: Oxford University Press, 1999), 664. For a collection of essays on science and imperial expansion, which only in part disproves that judgement, see John M. MacKenzie (ed.), *Imperialism and the Natural World* (Manchester: Manchester University Press, 1990. Another and better collection from the perspective of environmental history is Tom Griffiths and Libby Robin (eds), *Ecology and Empire: Environmental History of Settler Societies* (Melbourne: Melbourne University Press, 1997).
4. Michael Adas, *'High' Imperialism and the 'New' History* (Washington, DC: American Historical Association, 1993), 14. A fuller statement can be found in Michael Adas, *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance* (Ithaca, NY: Cornell University Press, 1989).