

Rachel
Carson
Center
Perspectives

On Water

Perceptions, Politics, Perils

Edited by
AGNES KNEITZ
MARC LANDRY



SPONSORED BY THE



Federal Ministry
of Education
and Research

RCC Perspectives

On Water
Perceptions, Politics, Perils

Edited by
Agnes Kneitz and Marc Landry

2012 / 2



About the Authors

Ewald Blocher received his MA in modern and contemporary history, medieval history, and political science from LMU Munich in 2008. Currently, he is a doctoral student in the Rachel Carson Center for Environment and Society's (RCC) doctoral program, "Environment and Society."

Eleanor Ruth Hayman graduated from the University of Central Lancashire with a MA in environmental ethics and is currently pursuing her PhD. She served as a research associate at the RCC from 2010–2011.

Julia Herzberg completed her PhD on autobiographical texts of peasants in Tsarist and Soviet Russia at Bielefeld University in 2011. She has been working at the RCC as a research fellow since 2009.

Agnes Kneitz completed her MA in modern and contemporary German history at LMU Munich in 2009. She is as a research associate at the RCC, where she is also a candidate in the doctoral program with a dissertation entitled *Eco-Novels: The Concept of Environmental Justice through Nineteenth-Century Social Novels*.

Marc Landry received his MA in German and European studies from Georgetown University, Washington DC, where he is currently finishing his PhD in history. He was a visiting fellow at the RCC from October 2010 to July 2011.

Felix Mauch studied modern history and cultural geography at the University of Freiburg, Germany. He currently is pursuing his PhD in the RCC doctoral program and works for the Center as a content developer for the Environment & Society Portal.

Wolfram Mauser is Professor and Chair of Geography and Geographic Remote Sensing at LMU Munich. He serves on numerous academic boards in the field of earth science and global change, including the academic board of the RCC.

Franziska Torma received her PhD in modern history from LMU Munich in 2009. She is currently working as a research fellow at the RCC. Her research interests include the history of science, the cultural and environmental history of the nineteenth and twentieth century, postcolonial studies, and approaches of the "spatial turn."

Alexa Weik von Mossner earned her PhD in literature from the University of California, San Diego in 2008 and is a postdoctoral assistant at the University of Fribourg, Switzerland. A former Carson fellow from June 2010 to June 2011, she is currently an RCC affiliate.

Contents

05 **Introduction**

Agnes Kneitz and Marc Landry

Perceptions: Environmental Knowledge and Knowledge Societies

07 **Water as White Coal**

Marc Landry

13 **Snakey Waters, or: How Marine Biology Structured Global Environmental Sciences**

Franziska Torma

23 **Shaped by the Imagination: Myths of Water, Women, and Purity**

Eleanor Ruth Hayman

Politics: Transformation of Landscapes

35 **Dammed Water: Water as a National Commodity**

Ewald Blocher

45 **Rising Waters: Submersion and Survival in Yung Chang's *Up the Yangtze***

Alexa Weik von Mossner

53 **The Domestication of Ice and Cold: The Ice Palace in Saint Petersburg 1740**

Julia Herzberg

Perils: Natural Disasters and Cultures of Risk

63 **The Perils of Water: Floods, Droughts, and Pollution as Natural Hazards and Cultural Challenges**

Felix Mauch

71 **Polluted Water**

Agnes Kneitz

77 **Sustainable Water**

Wolfram Mauser

Agnes Kneitz and Marc Landry

Introduction

On Earth, water is omnipresent. A basic building block for all life, it is also a critical resource with a complex history—fought over in times of scarcity, frightening in its role of destroyer, and invested with the power to administer human purification and atonement. Water’s cultural meanings, no less than its physical permutations, are always in flux. The many facets of water make it a rich subject for various fields of study and the Rachel Carson Center (RCC) actively encourages this confluence of disciplines and approaches. This issue of *RCC Perspectives* illustrates this diversity through a cross-section of research on water conducted by RCC-affiliated scholars. The collection of contributions showcases the RCC’s mission of producing research on the complex relationship between nature and culture. The pieces presented here exemplify three of the six thematic clusters that guide research at the RCC: Environmental Knowledge and Knowledge Societies, Transformation of Landscapes, and Natural Disasters and Cultures of Risk.

The the first section of the volume concentrates on humankind’s perceptions of water. In his essay, Marc Landry analyzes the metaphor of “water as white coal,” and describes the uneven course of hydroelectricity. Franziska Torma describes how the emergence of marine biology structured global environmental sciences, using expeditions and marine stations to explore and chart the new frontier—the ocean. A different approach is taken by Eleanor Hayman, who analyzes how our notions of water are closely linked to the female body and to discourses of objectification and control.

The second section addresses the politics and power of water. Ewald Blocher shows how Egypt’s Aswan High Dam project was not only a means of nation-building, but also masked the political reality behind the idea of the Nile as an ecosystem. Alexa Weik von Mossner’s contribution complements this piece by focusing on the political and social impact of transforming water into hydropower. In a review of the film *Up the Yangtze*, she unravels the power struggles accompanying the construction of the world’s largest hydroelectric power plant—the Three Gorges Dam in China. Discussing a different facet of water’s power, Julia Herzberg depicts how water in its frozen state can be used to challenge existing power structures.

The overarching topic of the last section is the diverse perils associated with water. Felix Mauch addresses various ways that water is constructed as “dangerous,” whether in its excess, absence, or transformation. Agnes Kneitz reflects on industrial water pollution and argues that taking clean water for granted has led to ecologically powerful misconceptions. Concluding the volume, Wolfram Mauser’s essay challenges our common understanding of water narratives, emphasizing water’s systemic power and the resulting consequences for our planet.

Perceptions: Environmental Knowledge and Knowledge Societies

Marc Landry

Water as “White Coal”

The Exposition Universelle is remembered for introducing the world to the Eiffel Tower, but the fair was also the site of another important debut: In the shadow of the immense iron structure that was to become the symbol of both a city and an era, French engineer Aristide Bergès launched the career of a concept that swept Europe and the world. Bergès’s innovation took the shape of an exhibit informing visitors about a new, and potentially useful, energy source. His display consisted of a turbine, two meters in diameter, placed above a plaster relief map depicting a section of the French Alps. On a plaque attached to the turbine, Bergès included a long inscription that began with the words “exploitation of white coal (*houille blanche*).” He used the metaphor white coal to describe the power of Alpine water, and argued that it represented “riches just as precious as the coal of the depths”¹ in an accompanying pamphlet. Bergès did not live to witness it, but his prediction about the value of this energy source proved more correct than he could have ever imagined. Over the course of the early twentieth century, Europeans harnessed Alpine water power to generate more electricity than any other energy source save coal. In the wake of the Second World War, the United Nations estimated that over half of Western Europe’s electricity—one-quarter of the continent’s—was produced by Alpine water power. The term Bergès coined also proved wildly successful. Though he had used it to describe the power potential of glacial runoff, white coal quickly became one of the most popular metaphors to describe hydroelectricity across the globe.

In the long history of water use and management, white coal belongs in one of the more recent chapters. What follows are some considerations on the emergence of the vision of water as white coal, and what it reveals about the history of both water and energy use.

1 Marcel Mirande, *Le comte de Cavour et la Houille Blanche* (Grenoble: Allier Père & Fils, 1927), 5–6.

Though the term white coal eventually came to mean hydroelectricity, Bergès had something different in mind. For him, the color white referred specifically to the eternal ice of Alpine glaciers, whose runoff he had managed to harness for industrial purposes. He had first done this at his own paper mill in the Isère Valley in the late 1860s. There, he had diverted a portion of the torrents descending from the Freydané glacier and the tiny Lac Blanc into metal pipes that led to a set of turbines in his factory. The enormous water pressure created by the 200 meter difference in elevation between the point of capture and the paper mill—the head, in engineering terms—provided the motive power to drive Bergès’s machines. The system was successful enough that by the end of the 1870s, Bergès was actively persuading other industrialists in the region to follow his lead. By the time of the Exposition Universelle, Bergès’s installations were capable of harnessing falls as great as 2000 meters. With the advent of long-distance power transmission in the 1890s, generating electricity became the preferred means of converting water power into useful energy. Nevertheless, the moniker white coal stuck.

Bergès’s ability to see white coal in glacial torrents speaks to a shift in the very definition of water power that was underway in the industrialized world around 1850. Harnessing water power was nothing new; in the Alps, water power had long played an important role. Indeed, during the Medieval and early modern periods, the Alps were a hot spot for the proliferation of waterwheels. Small-scale industries—textiles, paper-making, glass-making—flourished in pockets throughout the mountain range. But these facilities did not exploit the power of the enormous falls touted in Bergès’s exhibit. Alpine watermills, like all watermills worldwide, harnessed the power of relatively small falls that waterwheels could handle. Furthermore, mills were bound to those sites where abrupt descents in the streambed permitted an economical concentration of fall. Only the advent of modern turbine technology in the mid-nineteenth century permitted the exploitation of higher heads, making all running water in the Alps a potential source of energy. All that was required was a demand for energy and a means to direct that water onto a turbine. Bergès was one of several entrepreneurs at the time who experimented with systems to utilize high-pressure water power to support industrial endeavors in Alpine valleys. Thanks to electricity, and the development of long-distance power transmission in the 1890s, the energy of falling water no longer even needed to be utilized at the site of production. It also meant a new means of transforming water power into both light and heat. The unshackling of hydroelectric

exploitation from its earlier spatial limits was further reflected in the more general language we use to describe it nowadays. Up until the early-twentieth century, a “waterpower” was a noun denoting those geographic points where mills were, or could be, constructed. Nowadays, usually if one uses the term water power, instead of the more common hydroelectricity, it is to describe the general energy potential of water.

The provenance of the term white coal suggests that at the time the fossil fuel had especially positive connotations in certain circles. When explaining why he chose these words to describe Alpine waterpower, Bergès revealed that he had sought to “excite the imagination and signal with vitality”² that glacier water could be exploited for motive power. Clearly, Bergès believed that his coal-based metaphor would ignite European energy fantasies. The combination of coal and steam engines had indeed opened up unprecedented economic opportunities. Tapping into stores of solar energy that had accumulated over the span of geologic time burst the traditional constraints on economic activity. By the late nineteenth century, observers agreed that coal was the key source of economic growth and prosperity in that era. As a region, the Alps possessed precious little coal supplies, and many concerned with the economic development of the mountain chain worried about the consequences of this geologic reality. For such people, capitalizing on an energy source would have seemed a very appealing business proposition.

Interestingly, there is little evidence that the term white coal was intended to invoke images of hydroelectricity’s cleanliness. When explaining the advantages of white coal over its carboniferous cousin, boosters rarely included hygienic arguments. When listing the advantages of hydroelectricity over coal, contemporaries seem to have referred to coal’s “dirtiness” only in certain situations. The only times it was indicated that hydroelectricity was in any sense “cleaner” than coal was during discussions of using water power to provide electric traction for railways.³ Proponents of substituting hydroelectricity for steam emphasized that electric trains would be free of the plague of smoke and soot. In the Alpine lands, where the abundance of water power and the dearth of coal made electric traction an especially critical economic problem, supporters of electrification stressed particular travel benefits for the moun-

2 Mirande, *Le comte de Cavour*, 6–7.

3 Historian David Blackbourn also found that the argument frequently came up during discussions of railway electrification. See David Blackbourn, *The Conquest of Nature: Water Landscape and the Making of Modern Germany* (New York: W.W. Norton, 2006), 219.

tain region. They highlighted that smoke from steam-powered trains would no longer be an issue in the mountains' numerous tunnels, nor would it obscure the vistas that drew many passengers to the mountain railways.

Glimpsing coal in water also attached certain expectations to the energy source. Energy experts in the early twentieth century not only compared water power to coal, they gradually demanded it behave more like the fossil fuel. In the Alps, for example, after an initial phase of development when the choicest of hydroelectric sites had been exploited, engineers began to complain about the disadvantages of water power compared to coal. Chief among these was the seasonal variation in the availability of water. In the Alps, waterways run their highest levels during the summer melt period. During the winter time, less power is available because precipitation remains in the mountains in the form of ice and snow. Unfortunately, winter was precisely the time of year when demand for electricity—especially in the form of light—was highest. It is conceivable that Europeans could have adjusted their energy use habits to the seasonal rhythms of water power availability. Instead, they sought to counteract this perceived drawback, by finding ways to store water until it was needed. The mountainous Alps provided unique impoundment opportunities, both in lakes and valleys, and Europeans took great advantage of these. As of 1970, over three hundred new lakes dotted the Alpine landscape. The emergence of these new bodies of water reversed a global historical trend, whereby erosion in conjunction with human efforts had gradually been diminishing the number of Alpine lakes. It has been calculated that these reservoirs can store about 5 percent of the annual drainage in the Alps.⁴

While thinking of water in terms of white coal represented something new, the impulse to make such a comparison was not. A survey of modern energy history reveals that comparing potential energy sources to other valuable commodities—including other energy sources—has been quite widespread. No less an authoritative source than the theme song to the 1960s American sitcom *The Beverly Hillbillies* reminds us that oil was both “black gold” and “Texas tea.” Thanks to Rolf Peter Sieferle’s more scholarly contribution on the impact of coal in the industrial revolution, we know that some seventeenth-century Europeans conceived of the fossil fuel in terms of the primary biomass fuel of the era. Sieferle’s work is entitled *The Subterranean Forest*, a phrase

4 Werner Bätzing, *Die Alpen: Geschichte und Zukunft einer europäischen Kulturlandschaft* (Munich: C.H. Beck, 2003), 196.

he borrowed from the title of a treatise published by the German jurist Johann Philipp Bün-ting. Employed by the Electorate of Brandenburg's Upper Court Chamber, Bün-ting described how the transition to coal usage could relieve the widespread wood scarcity he perceived as a sign of the coming Judgment Day.⁵

The popularity of the term white coal waned dramatically in the postwar period. On the one hand, the positive connotations once associated with coal have largely disappeared. Since the nineteenth century, humans have been harvesting the subterranean forests with the same intensity once devoted to the clearing of forests and woods in some countries. At the outset of the twenty-first century, in the wake of smog, acid rain, and now climate change, the reputation of coal as an energy source has suffered in many circles. At the same time, with the advent of other sources such as nuclear power, the importance of hydroelectricity for energy systems has declined relatively.

Nowadays, potential energy sources are rarely described in comparison to past prime movers and fuels. Rather, it seems the most popular metaphors refer to the environmental impact of energy. Thus we read about “clean coal” and “green” solar and wind power. Curiously, while many insist that the future belongs to these green—and so-called renewable—energy resources, hydroelectricity is rarely included in such pronouncements. Some may find it difficult to refer to hydroelectricity as a green energy source in light of the far-reaching environmental changes caused by dams and diversions. But the lack of attention to hydroelectricity also stems from the perception that most of the planet's large scale hydroelectric potential has been exhausted. Historian Alfred W. Crosby sees the future of hydroelectricity in “thousands of unpretentious dams on minor rivers.”⁶ Nevertheless, with the current wariness of nuclear power in the wake of Fukushima and with no clear energy savior in sight, reasonable energy development might focus on extracting what power can be had from the humble lesser tributaries of the planet. The energy history of the Alps suggests that there is great power to be had in even tiny waterways. One thing is for certain: If hydroelectricity should ever enjoy a resurgence in popularity, it must do so with the help of another metaphor. In an age preoccupied not with industrialization but its supposed effect on the global climate, the era of white coal is officially history.

5 Rolf Peter Sieferle, *The Subterranean Forest: Energy Systems and the Industrial Revolution*, trans. Michael P. Osman (Cambridge: White Horse Press, 2001).

6 Alfred W. Crosby, *Children of the Sun: A History of Humanity's Unappeasable Appetite for Energy* (New York: W.W. Norton, 2006), 133.

Franziska Torma

Snakey Waters, or: How Marine Biology Structured Global Environmental Sciences

In the year 1902 an encounter of the monstrous kind aroused the attention of the German Kaiser. The *Daily Chronicle* announced the sighting of a giant “Sea Serpent off the Australian Coast.” In the article, the steamboat captain who had discovered the creature provided a detailed eyewitness account:

On the passage from Port Pirie to Sydney, when off Ram Head, a monster serpent was seen by several members of the crew. . . . Closer inspection proved it to be an immense serpent of, as far as could be judged, from 30ft. to 35 ft., with four dorsal fins about 6 ft. apart, standing about 4ft. or 5ft. high. The head resembled that of a seal, only it was much larger, being about 2ft. in diameter. . . . It was seen by myself, the second officer, and several others. All agree that it resembled the serpent seen by those on board the *Princess*, illustrated in the *Strand Magazine*, the only visible difference being the fins, which seemed more angular than those in the Magazine. The body of the serpent did not appear above the water, but it must have been of immense size.¹

Reichskanzler Bernhard von Bülow had ensured that the director of the zoological collection of the Royal Museum for Natural History, Karl Möbius, received the article for appraisal. His initial response was noncommittal. In the news article there was, he thought, “not much to be learned about the ‘great sea serpent’ other than that from time to time they had seen monstrously long, unknown creatures on the surface of the sea.” In course of the subsequent attempt to find a plausible explanation for the monstrous occurrence, however, Möbius warmed increasingly to the subject: “The perception of ‘large sea serpents’ was probably summoned up by the snake-like movement of the bodies of unusually long deep sea fish and giant squid which only come to the surface from the depths under particularly rare circumstances.” Examples followed: “Similar giant creatures have also become stranded on the north Atlantic coast and gave rise to

This essay was originally written in German and has been translated for the *Perspectives* by Brenda Black. Unless otherwise noted, all translations of German sources are also the translator’s.

1 Daily Chronicle, 19 August 1902, R 901/37635, Das Bundesarchiv [BArch; German Federal Archive], Berlin.

the kraken of Norwegian legend. A life-size model of a squid captured in the Japanese sea is displayed in the local Royal Zoological Museum.”² The letter closed with a reference to further literature on the subject—a reference in fact to *The Great Sea Serpent*, written by the director of the zoological and botanical garden of The Hague, Dr. Antoon Oudemans, which contained reports of more than 162 sightings of sea serpents between the years 1522 and 1890.

The appearance of this anecdote in the newspaper is not, perhaps, particularly remarkable for the time. In the popular media sea serpents were considered a newsworthy event and magazines had already introduced a number of prominent “fellow creatures.” It would be easy to dismiss the report as trivial, the stuff of gossip and legends. However, a couple of details make this incident worthy of closer analysis. It captured the interest of prominent scientific and political figures: Karl Möbius was not only a scientific expert in the German empire, but also the originator of the concept of “biocoenosis,” a key term in the creation of an ecological conception of the world. Both von Bülow, the head of government, and Wilhelm II, the head of state of the German empire, were involved in the investigation. Moreover, this was not an event of local relevance, but one that had occurred in the ocean on the other side of the world.

Why did this minor sighting turn into a matter worthy of so much attention? What narratives, networks of meaning, and interpretations does this episode offer, and how are they to be located in historical context? We are not concerned here with the question of what exactly the crew of the steamboat *really* saw, but rather with the expectations of the time and the explanatory model of life in the ocean.

It is clear that two very different world views are colliding here: a belief in sea monsters versus a scientific view. The commotion that the giant sea serpent stirred up in 1902 was merely a symptom of a new perspective that had become prevalent in the last third of the nineteenth century in Central and Western Europe and in the United States. People were “discovering” the ocean as a three-dimensional space, which—contrary to traditional beliefs—was filled with living organisms far into the depths. Thus the sea acquired a new value as an inhabited environment in addition to its previous attributes as a space for conducting travel and asserting power.

2 All quotes: Karl Möbius, Letter to the Foreign Office, Berlin 29 September 1902, R 901737635, BArch, Berlin.

The investigation of life in the oceans caused the world to be reevaluated in a multitude of ways. Research in marine biology brought together economic, political, and cultural interests. Furthermore, marine expeditions transmitted both specific impressions of the world and the respective opinions of participating scientists.

The Formation of a Global Environmental Science: Scientific Journeys, Expeditions, and Research Stations

The sea has held the attention of researchers for centuries. However, the term *Weltmeer* (world ocean), which can be found in oceanographic records and descriptions, first became commonplace around the turn of the twentieth century. Marine biology discovered various dimensions of the world: scientific expeditions measured the oceans, while marine biological stations traversed the extended surfaces of the coasts. Supplementing this horizontal scope of investigation, marine research also sounded the depths of the seas. Through scientific measurements and experiments, and the communication of these through narrative, the underwater world became visible, tangible, perceptible, and communicable as a multidimensional living space.

By the beginning of the twentieth century the contact between German scientists and the sea had crystallized into three main forms: First, there were the traditional journeys by scientists, primarily collecting sea creatures around islands or off coasts. Second, marine research and marine biology experienced an upswing due to the establishment of specialized expeditions. Third, researchers and the government attempted to establish a long-term presence on the sea by creating marine biology stations.

Travels of Individual Scientists

Specimen collectors conducted research mainly along the coastlines. While the German colonies in the South Seas and Africa were one of the target areas, the scope also reached beyond the sphere of direct influence: German marine biologists had been working since the beginning of the nineteenth century in the Red Sea, the Black Sea, South America (Bahia, Rio de Janeiro, Chile), on the Guinea Islands, in Morocco, in Madeira, on Sumatra, and on Mauritius and the Seychelles. They were particularly interested in the subtropic and tropic environments and sought a scientific—and perhaps also emotional—“place in the sun.” One could argue, perhaps provocatively, that through

marine biology—and thus through gentler methods, namely those of science—the Germans managed to accomplish what they had failed to do through power politics: they established a global presence.³

Expeditions

While the scope of individual researchers was limited to a particular region, oceanographic expeditions circled the entire globe. Just as the routes of the ships encompassed the whole world, the areas of marine research activity were also polycentric. This era of oceanography began with the investigation of the deep sea and the open waters.⁴ Not only did the traditional naval powers England and France organize expeditions: Between 1875 and 1880 the American Alexander Agassiz fathomed the Atlantic and Pacific Ocean to depths of approximately nine kilometers, the deepest measurement at that time. In 1889 the Kiel-based Plankton Expedition covered close to 16,000 nautical miles in the ship the *National* on a route between Greenland, Newfoundland, the Bermudas, Cape Verde Islands, and Brazil. Between 1898 and 1899 Carl Chun undertook an oceanographic journey around the world on the German ship *Valdivia*, which traveled through the Atlantic and Pacific Oceans. These oceanographic expeditions were projects of national prestige, highly subsidized by the state—the journey of the German *Valdivia*, for example, received funds from the state amounting to 300,000 Reichsmark.

Marine biological work was an important component of these expeditions, and the “discovery of life” in the sea was one result of these journeys. Thus, for example, the writer and science journalist Carus Sterne issued the opinion in the *Täglichen Rundschau* (14 March 1891) that the Kiel Plankton Expedition had set as its goal the “census of the ocean provinces.” Indeed, the Kiel scientists had taken countless water samples along the route and quantified the number and concentration of the microorganisms and particulate matter that form the basis of the marine food chain and the oceanic ecosystem. With the counting of the living organisms in the sea, a “new epoch in the study of marine life”⁵ had begun! Even though this method of recording

3 A. A. Aleem, “German Contributions to Marine Biology in the Red Sea during the 19th Century,” in *Ocean Sciences: Their History and Relation to Man*, ed. by Walter Lenz and Margaret Deacon (Hamburg: Bundesamt für Seeschifffahrt und Hydrographie, 1990), 109–13.

4 Helen Rozwadowski, *Fathoming the Ocean: The Discovery and Exploration of the Deep Sea* (Cambridge, MA: Belknap Press, 2005).

5 “Unterhaltungsbeilage,” *Tägliche Rundschau*, quoted in: Viktor Hensen, *Die Planktonexpedition und Haeckel’s Darwinismus* (Kiel: Verlag Lipsius & Tischer, 1891), 80–1.

organisms in the sea by means of statistics was subject to harsh criticism, the journey marks a shift in perspective. By expanding the focus of biological research from the coasts and surface of the water to encompass the high seas as well, the ocean was “discovered” as an inhabited, animal-filled, and biologically dynamic environment. While Charles Darwin had taken for granted that oceans were relatively poor in life-forms, by the turn of the twentieth century they were understood to be teeming with life. Sea cucumbers and polyps populate Carus Sterne’s article. Terms such as *Tierstaaten* (animal nations) and *Tierstrassen* (animal roads) had found their way into the scientific terminology of marine biology.⁶

While the Kiel expedition was based on rational-quantifying research methods, the “sea monster” continued to live for the German *Valdivia* expedition. Neither the leader of the expedition, Carl Chun, nor the scientific experts could escape the fascination inherent in the deep-sea fauna. Carl Chun raved, “for the first time we encountered the magic of the pelagian deep-sea fauna, a profusion of new life forms notable for their organization.”⁷ Although deep-sea fauna was understood as a component of the oceanic ecosystem and metabolism, it was described as something strange and wonderful, as the spawn of a fantastic world. The semantics of the biologically impossible was extended from monsters and prodigies to those “living sensations” that were fished out of the depths: For example, black squid, which “have always aroused the interest of researchers to a particular degree with their equipment of phosphorescent organs and their bizarre habits.”⁸ Blood-red crustaceans, medusas, winged snails, worms, thaliacea, and deep-sea fish overwhelmed the researchers with anatomical curiosities, such as oversized heads, jaws, and eyes on stalks as well as phosphorescent lights on their bodies. The ability of these creatures to live at great depths and under inconceivable water pressure also made them organisms whose existence seemed inexplicable.

The diverse fascinations of contemporaries with these expeditions had three main causes. First, global expeditions were instruments of German “cultural propaganda” and offered a good opportunity to demonstrate the nation’s international standing without involving political and military rituals. Second, the globe was being discovered as a multidimensional, inhabited, and dynamic space—both in its horizontal expanse and in the vertical depths of the oceans. Third, the sociocultural and emotional implications

6 Hensen, *Planktonexpedition*, 30–40.

7 Carl Chun, *Aus den Tiefen des Weltmeeres* (Jena: Verlag Gustav Fischer, 1903), 226.

8 *Ibid.*, 86–7.

of the so-called discovery of the world under the sea were not merely scientific. Its manifestation was that of something hidden and fantastic; that is, it was based on an inherently romantic narrative that projected notions of the exotic and the strange onto the underwater world.

Marine Biology Stations

Simultaneous with the multifaceted “acts of discovery” by the large expeditions, the turn of the twentieth century was at the time already thought of as being accompanied by a shift from extensive to intensive research. The discovery of new species was no longer considered the paradigm of this emerging scientific field, but rather precise examination of already existing species; depending on their regional situation, institutes of marine biology were often able to do both.

The first stations were established on and near the European seas. This was motivated by the idea of providing researchers with “living material” for their work. In 1870 the German zoologist Felix Anton Dohrn set up the zoological station in Naples; a wave of new stations followed throughout Europe as well as in North America. Plans to spread out over the coasts outside of Europe and North America were also abundant. Among the marine biology research institutions, the South Pacific was an object of particular interest for the Germans. Dohrn had justified his decision to establish a station there in 1894 with arguments based on cultural ideas of the tropics: “If there are places that have a particular draw for the researcher and that would offer rich rewards for his efforts, then the tropical coral reefs are among them.”⁹ When the station was closed in 1897, the long-term presence that German marine biologists had aimed for also disappeared.

Renewed attempts in 1905 to rebuild the aquarium of Dar es Salaam—which was under the charge of a German ship doctor—into a laboratory for marine biology show clearly that the scope of plans was constantly expanding away from the local and nearby waters, and ultimately becoming a global aspiration. Arguments of national prestige and the need to fulfill this cultural responsibility, as the investigation of the tropical seas was understood to be, were combined with scientific arguments: for German marine biologists the “tropical seas, the setting for the richest development of organic life,”¹⁰ exerted such a lasting attraction that having a national presence was felt to be a

9 Felix Anton Dohrn, Letter, 15 January 1896, Neapel R 1001/6212, BArch, Berlin.

10 Carl Chun, Letter, 29 August 1906, Leipzig, R 1001/6208, BArch, Berlin.

downright necessity. At the same time economic motivations should not be forgotten: the investigation of the sea had the potential to help find foodstuffs from the sea and thereby contribute to feeding the colonial population. Such arguments demonstrate the view of marine research as an environmental science with many practical implications for politics and economics.

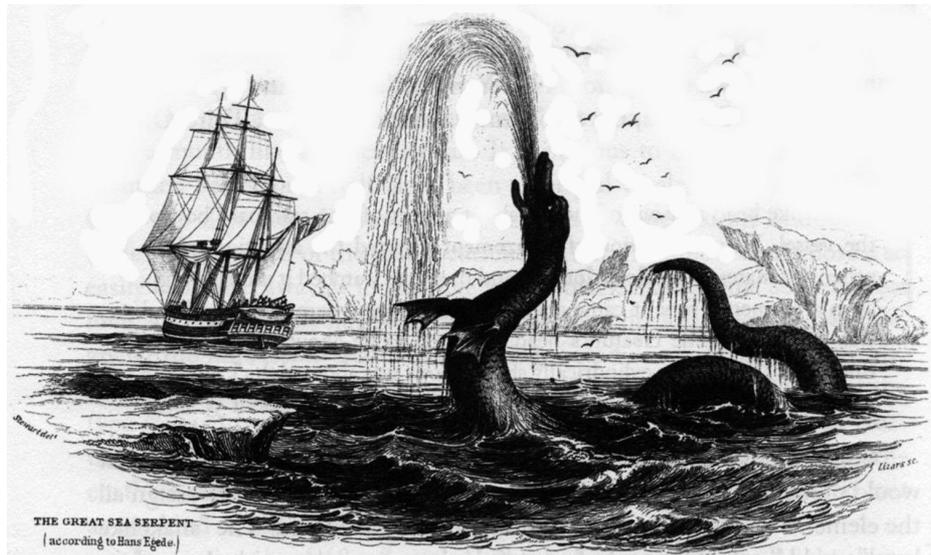
In these stations, the nature/culture divide that is problematized in the environmental humanities today was historically up for negotiation. It is characteristic of these research spaces that the separation between nature and culture dissolved within them. They merged with their environment, which allowed them to become nature-culture hybrids. What was true for European stations was even more the case in the colonial regions, as Friedrich Dahl, the field scientist of Ralum, explained in 1895: “The location is ideal for marine research. Next to the shore there is a narrow coral reef, not far beyond that there are depths of up to hundreds of meters. The house consists of three rooms. . . . The middle room will contain the aquarium, the library, the instruments—insofar as they would not be better housed on the veranda—and the chemicals and supplies of [specimen] glasses.”¹¹ While the marine life-forms gained entrance to the cultural area of the station through the aquariums, the station merged architecturally into the maritime environment. As a living space for animals, as well as a living and working space for people, the spheres of marine environment and research were intimately intermingled.

Summary

Where, then, is the place for the “great sea serpent” cited at the beginning within this new marine biology? Antoon Oudemans’s book about giant sea serpents, which Karl Möbius recommended to the Kaiser, demonstrates in highly compressed form the development of modern environmental science precisely on the boundary between nature and culture, between natural science and cultural imagination. On the specific matter of sea serpents, Kaiser Wilhelm would have found plenty of illustrative material in this book in 1902, for Antoon Oudemans was obsessed with this creature. As the director of the zoological museum in The Hague he really ought to have been—given his scientific profession—disinclined to hold such attitudes that today are generally dismissed as

11 Friedrich Dahl, Letter, 30 June 1896, Ralum, R 1001/6212, BArch, Berlin.

Figure 1:
The „Great
Sea Serpent“
according to Hans
Egede, 1734
(Reproduced in:
Ellis, R. 1994.
Monsters of the
Sea. Robert Hale
Ltd.)



fantasizing. Nevertheless, the foreword of the book shows indications of a fanciful conviction, the belief in being able to scientifically document the existence of giant sea serpents through eyewitness accounts, illustrations, and extensive data collection, worldwide in scope and spanning over 450 years. The author made use of the entire arsenal of the cultural techniques of science at his disposal in order to create an impression of authenticity. Exact photographs and measurements were, he believed, to be given preference over paintings and descriptions. Oudemans attempted to pin down the sea serpent with the zoological terminology that was standard for taxonomical, physiological, and psychological classification of animals, such as: appearance (the lengths of various limbs, texture and consistency of the skin, colors and variations, physiological characteristics); behavior; geographical distribution; and comparison with similar animals. The style of description, the taxonomical parameters, and the early observations of animal psychology might have been used to describe any other animal. The sea serpent as an object of scientific study had originated in the realm of “fabulous zoology,” and lived on in the natural sciences. Within the physical, institutional, and epistemic framework of marine biology Oudemans’s book is nothing less than an attempt to connect the worldwide sightings of an unknown sea creature—which in this case belonged to an even older discourse of monstrous creatures—with a concrete species and thus to make the unknown scientifically describable. In so doing an object of study is constructed that can

be described sociologically as a *boundary object*,¹² an abstract or concrete item which, while the epistemic core remains the same, acquires various interpretations depending on one's standpoint, functioning in a variety of historical contexts and crossing boundaries—in this case, the boundaries between scientific reporting, entertainment media, and popular imagination. The giant sea serpent shaped the basic outlines of one of the first global environmental life-sciences.

Further Reading

Aleem, A. A. "German Contributions to Marine Biology in the Red Sea during the 19th Century." In *Ocean Sciences: Their History and Relation to Man*, edited by Walter Lenz and Margaret Deacon. Hamburg: Bundesamt für Seeschifffahrt und Hydrographie, 1990.

Rozwadowski, Helen. *Fathoming the Ocean: The Discovery and Exploration of the Deep Sea*. Cambridge, MA.: Belknap Press, 2005.

12 Susan Leigh Star and James R. Griesemer, "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39," in *Social Studies of Science* 4 (1989), 387–420.

Eleanor Ruth Hayman

Shaped by the Imagination: Myths of Water, Women, and Purity

Riddle I. Constructed Waters

How is water described and imagined, read and dreamed? How has the image of the female been linked to notions of water, purity, and desire? How is the female body still tied to images of water and how does it continue to be shaped by its materiality? What has all this got to do with bottled water and breast cancer?

“Modern” water is a complex blend of gendered and historical narratives. The manner in which water has been and is defined, and the ways in which it is managed, are products of a hegemonic and now normalized perception of water. Our assumptions, grounded in the dominant metaphors of Western epistemologies, construct a water that bears all the hallmarks of a neutral, passive resource. Modern water is coded as an inanimate commodity to be regulated and managed: it has a “social life” separate from the human animal. For all its neutrality, perceptions of water are steeped, brewed, and percolated in gendered mediums. Water’s gendered materiality comes into question when viewed in light of environmental systems, toxic substances, and biological bodies. It is this critical interlacing of ideas about gender, purity, and power that makes water intensely political.

Gender as a practice is fluid.¹ It is culturally inscribed, and works by “shaping, molding, representing, consuming, manipulating, and producing environmental histories.”² Exploring the gendered dimensions of hydro-environmental problems can, therefore, illuminate new approaches to (hydro-)historical narratives. However, from my perspective, it is not enough to reveal how gender “works” within these narratives. This is

I would like to thank Anne Milne, who first suggested starting an Ecofeminism Reading Group with me at the Rachel Carson Center in 2011 and has been instrumental in my focus here. Enormous help was also sketched out by the reading group members, who condescended to read and critique this paper—it has been transformed under their wise and generous suggestions—thank you so very much! I’d also like to thank the editors Rachel Shindelar and Katie Ritson for their patience and recommendations. Isabelle Kunze and Yousif Ammar also spent considerable time and effort on many parts of this paper. To all I am immensely grateful.

- 1 Judith Butler, *Gender Trouble: Feminism and the Subversion of Identity* (New York: Routledge, 1990); Butler, *Undoing Gender* (New York: Routledge, 2004).
- 2 Virginia Scharff, ed., *Seeing Nature through Gender* (Lawrence, KS: University Press of Kansas, 2003), xv.

important research, but what can we do with these myths that knot nature and culture together with such powerful consequences? I want to go one step further by asking how ways of perceiving water—which have all too often been locked into gendered myths—can be re-imagined.

With this in mind, I sketch out the historical riddle of modern water, and then illustrate how the riddle of a bottled water advertisement challenges these gendered myths. I also show that in the process dangerous new myths are simultaneously created. Finally, I attempt a conclusion by describing a vision of the “feral waters” of the future.

Riddle II. Invisible Waters

In Ivan Illich’s *H₂O and the Waters of Forgetfulness*, an incisive exposure of our contemporary myopic perception of water, the author highlights water’s problematic dualisms. Illich argues that “water, throughout history, has been perceived as the stuff which radiates purity: H₂O is the new stuff, on whose purification human survival now depends. H₂O and water have become opposites: H₂O, is a social creation of modern times, a resource that is scarce and calls for technical management.”³ Our desires can never be placated by this sterilized, characterless chemical formula. The eco-feminist Greta Gaard takes another approach; her work exposes water and wastewater dualisms. She places this within the broader western tradition of conceptually separating culture and nature, wilderness and civilization, male and female, etc. Ultimately these binaries produce a “nature” that is severed from humanity. The “normalizing” tendency of these dualisms, and our consequent perception of water, are, to say the least, alarming.⁴ Consider our paradoxical acknowledgment that we are a part of nature, dependent on fresh water to live, and that global fresh water, as a whole system, is in a critical—if not irreparably damaged—condition.

To unpack water’s dual nature(s), and to reveal the frameworks that sustain these perceptions, it is worth looking at the way in which the imaginary surrounding water is largely tied to the Western ideal of the feminine. Greta Gaard, for example, makes

3 Ivan Illich, *H₂O and the Waters of Forgetfulness*, Ideas in Progress (Marion Boyars Publishers: London, 1986), 75–6.

4 Greta Gaard, “Women, Water, Energy: An Ecofeminist Approach,” *Organisation & Environment* 14, no. 2 (2001): 159.

a provocative link between the positions and treatment of women in Western culture and the treatment of nature (water). I would argue that three mutually reinforcing “watershed mentalities”⁵ sustain this gender-water bondage.

Firstly, the increasing technological manipulation of water and the ambitious water infrastructure provision to western European city households in the nineteenth century led to water’s increasing invisibility and abstraction. In his book *What is Water? The History of a Modern Abstraction*, Jamie Linton illustrates this by reflecting on how the “placelessness of modern water (perhaps best symbolized by the tap) is the transfer of water control to placeless discourses of hydrological engineering, infrastructural management, and economics.”⁶ Dean Bavington argues that the notion of passive, yielding (feminine) water has been constructed with the ideological footprint that it *needs* to be managed.⁷ Ecofeminism exposes concepts such as water as a passive (and invisible) resource, or as a part of a pristine nature. Indeed, it seeks to respond to the ingrained power of social creations of nature (water) that ossify various intersecting forms of “oppression,” whether of race, gender, age, or class.

In their provocative paper entitled “Environmental Orientalisms,” Suzana Sawyer and Arun Agrawal seek to do just this. I classify this as the second form of watershed mentality. The authors expose a form of labeling within the colonial imagination. They note, for example, that “native topographies and peoples [were labeled] as feminine spaces to be violated, and thereby instantiated a sexual/racial hierarchy between colonizer and colonized.”⁸ The environmental historian Donald Worster’s concept of “imperial water” bleeds into Sawyer and Agrawal’s narrative of gendered and sexualized virgin territories (waters), and highlights how, through a reading of both nature (water) and gender, fractures across new lines of race, class, and ethnicity can be illuminated.

5 After Irene Klaver, “Reconnecting Visible and Invisible Water Infrastructures with Water Bodies,” *Thinking with Water*, last modified June 2010, accessed on 08 May 2012, <http://thinkingwithwater.net/content/reconnecting-visible-and-invisible-water-infrastructures-water-bodies>.

6 Jamie Linton, *What is Water? The History of a Modern Abstraction* (Vancouver: UBC Press, 2010), 18.

7 Inspired by Illich’s notion of iatrogenesis (iatrogenesis is conventionally used in medical language to denote an inadvertent adverse effect or complication resulting from medical treatment or advice), Bavington uses the term here in the context of environmental (water) conservation management. Dean Bavington, “The Iatrogenical Effects of Environmental Management: Servicing a Needy Nature,” in *Occasional Paper Series* (York University Press, 1998).

8 Suzana Sawyer and Arun Agrawal, “Environmental Orientalisms,” *Cultural Critique* 45 (2000): 72.

Figure 1(l):
Palmolive Soap
advertisement
(Courtesy of Collection
de la fondation
Abderrahman Slaoui:
edmalika@
connectcom.net.ma)

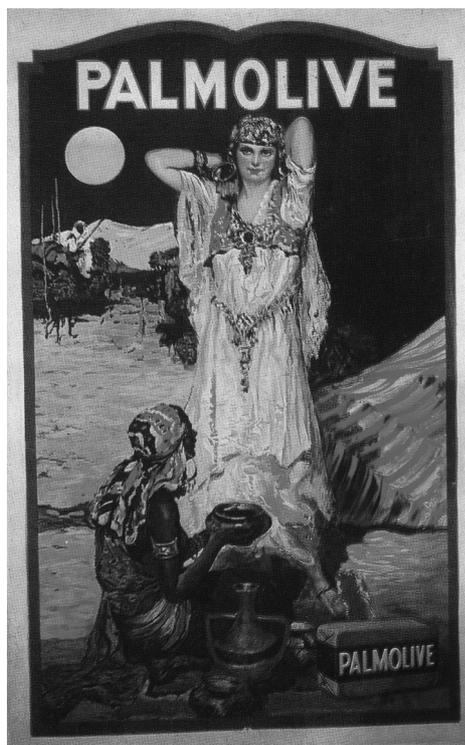


Figure 2 (r):
Railroad adver-
tisement from the
French Colony,
Morocco (Courtesy
of Collection de la
fondation Abderrah-
man Slaoui:
edmalika@connect-
com.net.ma)



Water, and all the tropes generated in its name, was therefore crucial for this “repression” to be sustained. Specifically, “the availability and use of water is a race and class issue but its political enmeshment is occluded by its location within scientifically neutral discourses of hygiene and medicine.”⁹ One could describe this as *hydro-orientalism*: by bringing colonial waters under a western epistemological and material control, colonial powers forced the development and diffusion of the ontology of modern water.¹⁰

Thirdly, parallel to the imperial conquest of “premodern” waters and the construction of invisible hydraulic infrastructures in the nineteenth century, a proliferation of impressionist and expressionist artists tied the female and water together in idealized, abstract, and sensual ways. Edgar Degas, Pierre-Auguste Renoir, Ernst Ludwig

9 Rakhika Mohanram, “White Water: Race and Oceans Down Under,” *Journal of Colonialism & Colonial History* 4, no. 3 (2003): 38.

10 Linton, *What is Water?* 59.

Kirchener, Gustav Courbet, and Jean Dominique Ingres (to name but a few Western artists) all focused on the female nude as “bather,” furthering the construction of sensual, gendered waters. Illich summarizes as follows:

Water, which had been perceived as the feminine element of nature, in the nineteenth century was tied to a new ‘hygienic’ image of woman, which was itself a creation of the Victorian age. Only the late nineteenth century tied female nudity as a cultural symbol to the tap water in the bathroom. The proximity of suds and nude in the bath domesticated both water and flesh. Water became the stuff that circulates through indoor plumbing and the nude became the symbol of a new fantasy of sexual intimacy defined by the newly created domestic sphere.¹¹

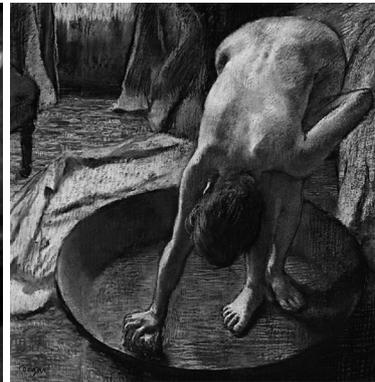


Figure 3 (l):
Edgar Degas's *The Bath*, 1886 (Zenodot Verlagsgesellschaft mbH: <http://www.zeno.org>)

Figure 4 (r):
Edgar Degas's *Woman in the Bath*, 1886 (Zenodot Verlagsgesellschaft mbH: <http://www.zeno.org>)

These powerful dualisms of pure/impure and whore/goddess are calcified and yet still in service in modern water power struggles.

Riddle III. Captured/Circulating Waters

Contemporary bottled water advertising is a highly visible aspect of modern water, and takes on what I call a hyper-constructed vision of water. Bottled water is a contained and passive water, and is thus desirable. It is water that is marketed by its claim to be pure, uncontaminated, and youth- and health-enhancing.

¹¹ Illich, *H2O*, 1.

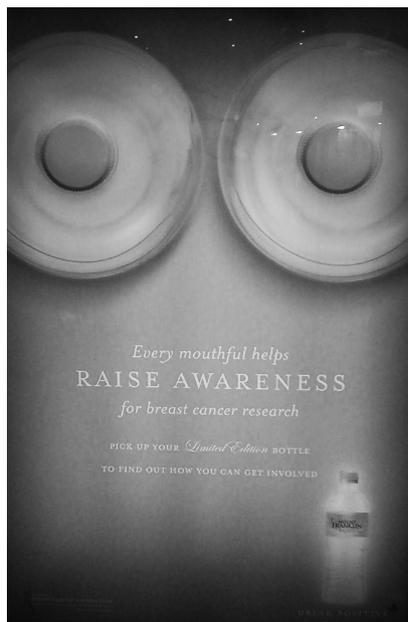


Figure 5:
Mount Franklin
spring water
advertisement, 2007
(avlyxz via flickr:
<http://www.flickr.com/photos/avlyxz/2903117655/>)

In the past five years alone there has been an abundance of bottled water advertisements, all of which are tantalizing and seductive portrayals of the nude, wet, “white” female/water performance.¹² Art historian and critic John Berger’s seminal work, *Ways of Seeing*, reflects on five hundred years of Western art and argues that “the essential way of seeing women, the essential use to which their images are put, has not changed. Women are depicted in a quite different way from men—not because the feminine is different from the masculine—but because the ‘ideal’ spectator is always assumed to be male and the image of the woman is designed to flatter him.”¹³ However, there is another mode of bottled water advertising (see fig. 5) that uses gendered images whilst at the same time subverting recognized norms.

These images show an implicit internalizing of the female signifier on the one hand, whilst on the other shifting recognized boundaries, precisely because human bodies are inherently “contaminated,” permeable, leaky, and materially fluid.

Various thinkers have sought to unpack this “intersubjective” fluid framing of human existence. For example, Stacey Alaimo notes that recognition of flows between human bodies and non-human nature alters the sense of the human subject and challenges perceptions of environmental ethics.¹⁴ Stefan Helmreich’s work on marine microbiology or the “inner ocean” draws “attention to how our bodies’ ecologies are networked to wider oceanic ecologies shaped by such phenomena as blooms of neurotoxic bacteria, which may flow into our nervous systems via drinking water and food chains.”¹⁵ Lastly,

12 See: *Mattoni* mineral water (Italy, 2009), *Vittale* mineral water “Water Your Beauty” (Brazil, 2008), *Smart Water* “My Secret Revealed—I’ve got nothing to hide” (United States, 2007–2009) or Jennifer Aniston’s *Sex Tape Smart Water* (United States, 2011), *Vitasnella* mineral water “You’ll want to wear nothing but your body” (Italy, 2009), and the *Perrier* short film (France, 2011). Visuals are all easily accessible online.

13 John Berger, *Ways of Seeing* (London: Penguin Books, 1972), 58.

14 Stacy Alaimo, *Bodily Natures: Science, Environment, and the Material Self* (Bloomington: Indiana University Press, 2010), 2–4.

15 Stefan Helmreich, “Commentary on Water Virtual Issue” *Cultural Anthropology* (2010): www.culanth.org/?=node/361.

Myra Hird's research on microbes and micro-ontology reveals how human bodies are a "mass of interacting selves. A body's capacities are literally the result of what it incorporates; the self is not corporeal but corporate." These flows of viruses, bacteria, and chemicals, often with water as the primary vector, may indeed alter or add to DNA production, which in turn "effect variations in sex and fertility without any recourse to sexual reproduction."¹⁶ In terms of bottled water and breast cancer awareness campaigns, there are some extraordinary tensions here that illuminate gendered flows. We can see these tensions in figure 5, which shows the bottled water advertisement of a Coca-Cola subsidiary.

I chose this advertisement for the Australian Mount Franklin's bottled spring water ("Australia's favorite premium bottled water brand"¹⁷) as it knots together gendered water narratives on a broad series of registers. At first glance, Mount Franklin's bottled water advertising might seem to be buying into a rather predictable and sexualized genre of marketing (the bottles on billboards were even produced in 3D¹⁸). However, there is actually something very interesting going on here. These bottles of spring water are staking out volatile ground within breast cancer territory—another form of hydro-environmental-orientalism, perhaps? As the language of the campaign itself suggests, by "drinking" from the artificial breast, one is not only helping raise awareness of breast cancer, but supporting female breast cancer research.¹⁹ By using the breast-bottle aerial image, the female breast (although of course males are also susceptible to breast cancer), is collapsed into a prosthetic appendage with a plastic pink bottle-top nipple, complete with liquid content. This confuses the nurturing image of breast/breast milk and breast/bottle milk. It is further violated by the idea that this Mount Franklin spring water is pure and that the cancerous breast is impure—replicating the whore/goddess, water/wastewater dualisms. Indeed, the double entendre read into "every mouthful helps," and "raise" awareness supports this hybrid and sexually-confused claim.

16 Myra Hird, *Sex, Gender and Science* (New York: Palgrave Macmillan, 2004), 74–5.

17 "Taste and Quality" on the official site of Mount Franklin Spring Water, accessed 21 March 2011, <http://www.mountfranklinwater.com.au/drinkPositiveTasteAndQuality.aspx>.

18 See "Breast Cancer Awareness Poster," flickr, last modified 29 January 2004, <http://www.flickr.com/photos/10185659@N04/2912520805/in/pool-892622@N22/>.

19 On a cynical note, Coca-Cola Amatil, which owns Mount Franklin spring water, gave only 250,000 Australian dollars to breast cancer research in 2007 on the back of a 4.6% rise in their share of the bottled still-water market in 2006 due to their Breast Cancer Campaign tie-in. As the Sydney Morning Herald wryly reflected, "Good causes pay dividends."

Ultimately, the idea of the breast-bottle is destabilized; the bottle is parodied as a breast—neither entirely human nor entirely artificial—supporting Donna Haraway’s “cyborgian” (hybrid) thinking, which seeks to subvert nature/culture binaries.²⁰ It further alludes to some women’s choices to have surgically implanted plastics to enhance their “natural” breast size. Indeed, the aerial perspective of the bottle-breasts suggests the female in a supine position—won over/dominated/passive. The symbolic Barbie-pink color of the cap and label feeds into constructions of femininity and, of course, is the ribbon color of the international breast awareness campaign. Catriona Sandilands refers to this woman/water performance as a fluid state through which water and woman disrupt each other as a “recognition of the categories’ perpetual incoherence.”²¹ She continues by arguing that resistance to hegemonic narratives, through destabilizing connections between women and nature, is one of eco-feminism’s many subversive tactics. Mount Franklin’s advertisement, consciously or not, does exactly this.

I would argue that sites of resistance, such as this advertisement should not merely be re-readings, but rather energies that generate new spaces. Such potential spaces have been described as “in between,”²² “playing in the gap,”²³ “mushy materiality,”²⁴ and “feral ground.”²⁵ I have chosen the term “feral waters.” Performances that operate in these feral waters often do so unwittingly. For example, within one register, this savvy bottled water advertisement succeeds in smudging ideas of what is natural and unnatural by presenting an image with which we are uncomfortable. It reveals a set of gendered historical narratives that have produced storied bodies and waters.

On another and equally challenging register, there is a very material way in which gender itself has been and is manipulated through biological processes (in this case hormones²⁶) in the environment, linked directly to the bottling of “pure” water in “impure” plastic containers. By this I refer to endocrine disrupters: industrial pollutants such as

20 Donna J. Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (London: Free Association Books, 1991), 149–81.

21 Catriona Sandilands, *The Good-Natured Feminist: Ecofeminism and the Quest for Democracy* (Minneapolis: University of Minnesota Press, 1999), 120.

22 Lorraine Code, “Thinking about Ecological Thinking,” *Hypatia* 23, no. 1 (2008): 187.

23 Sandilands, *The Good-Natured Feminist*, 120.

24 Helmreich, *Commentary on Virtual Water*.

25 Anne Milne, “‘Fully motile and AWAITING FURTHER INSTRUCTIONS’: Thinking the Feral in Bioregionalism,” in *The Bioregional Imagination*, ed. by Tom Lynch, Cheryl Glotfelty, and Karla Armbruster (Athens: University of Georgia Press, 2012), 329–46.

26 Biological processes are themselves influenced by cultural constructions in the way that they alter the way bodies produce sex hormones.

pesticides, drugs, and compounds from the plastic industry, which mimic female sex hormones, also known as xenoestrogens. Nancy Langston has researched this at some length: “endocrine disrupters connect environmental histories of the body with environmental histories of wild places and wild animals . . . our bodies are how we’re most natural, but now they’re also how we’re most industrialized.”²⁷ Although there has been much research revealing the altered genders and reproductive potential of fish, alligators, and birds exposed to unprecedented levels of xenoestrogens in rivers, the literature on PET plastic bottles (that package much spring water, soft drinks, and other beverages) has, until recently, not come under scrutiny.

The Mount Franklin bottled spring water website details the campaign that reduces ecological and carbon footprints, and highlights their use of extra-light PET bottles, with a commitment to recycling. However, there have been a series of scientific papers pointing to the chemical instability of the PET bottle, which—depending on its manufacturing source, its exposure to high temperatures, and the length of time a fluid is stored or if it is reused—leaches endocrine disrupters, specifically antimony, into the bottled water.²⁸ There is the distinct possibility that consuming quantities of “pure” spring water (whether it be Mount Franklin’s or any other brand) has the potential to introduce increased levels of estrogen-mimicking chemicals into the human body. These have been directly linked to disruptions in the reproductive process (in both human males and females), as well as accelerated growth of breast cancer cells.²⁹ It is ironic to note that on Coca-Cola Amatil’s webpage in their section on *Sustainability and the Environment*, Mount Franklin is marketed as one of the top ten “Most Trusted Brands” of bottled water.³⁰

By exploring this storied water and unpacking complexities that are produced, eco-feminism exposes hegemonic definitions of both “water” and “woman” that embody

27 Nancy Langston, “Gender Transformed: Endocrine Disrupters in the Environment,” in *Seeing Nature Through Gender*, ed. by Virginia Scharff (Lawrence, KS: University Press of Kansas, 2003), 130–1.

28 For more detailed information on PET bottle instability, please see the following article: Westerhoff, P., P. Prapaipong, E. Shock, and A. Hillaireau, “Antimony Leaching from Polyethylene Terephthalate (PET) Plastic Used for Bottled Drinking Water,” *Water Research* 42, no. 3 (2008): 551–556. For contamination of PET bottles as transnational phenomenon, see Martin Wagner and Jörg Oehlmann, “Estrogenic Activity in the E-Screen” *The Journal of Steroid Biochemistry and Molecular Biology* 127, no. 1–2 (2010): 128–135, doi:10.1016/j.jsbmb.2010.10.007.

29 P.D. Darbre, “Environmental Oestrogens, Cosmetics and Breast Cancer” *Best Practice & Research Clinical Endocrinology & Metabolism* 20, no. 1 (2006): 121–43.

30 In Millward Brown’s February 2010 survey of Most Trusted Brands, Mount Franklin was 7th in the Top 10, and one of only two Australian-owned brands on the list. <http://ccamatil.com/InvestorRelations/md/2010/Mount%20Franklin%20and%20McGrath%20Foundation%20050510.pdf>

gendered power relations. As Sandilands clearly points out, this plastic-related cancer is “not the evil technology of male culture writing itself on a natural gendered body; that very body is an artifactual co-production of nature and technology, and the cancer (and/or xenoestrogens) is a very deadly part of the same complex.” With this detailed example, it is not hard to see how hydro-social implications for both water and gender are played out politically in public health arenas.

Riddle IV. Unstable/Feral Waters

I am seeking to sketch potential worlds that are “storied” and indeed “materialized” quite differently from what has become menacingly familiar. I am offering a re-examination of our social relationship with water on a very ordinary and daily level by *re-imagining* how it is seen, thought, and understood. What is our relationship to water, to bottled water, and to bottled-water advertising that utilizes the breast image in dubious ways?

Unintentionally, Mount Franklin’s bottled water breast cancer awareness advertisement illuminates how water is gendered, controlled, and constructed, whilst at the same time ignorantly (or ironically) highlighting links between plastic-produced endocrine disrupters in water and breast cancer. At worst, the breast cancer awareness campaign (through encouraged sales of bottled water) increases consumption of contaminated water that has been shown to stimulate (breast) cancer cell production. On the one hand, the power of this image challenges, disgusts, and disrupts accepted notions of purity, gender, and water by de-familiarizing the simple alignment of woman and water. On the other hand, it complicates and exposes the fluidity of material/bodily boundaries, designations of gender, and the production of knowledge. Ultimately it narrates a story that politicizes the nature of bottled water in a new way and challenges the insidious myths sustaining certain relationships between water, bodies, and accepted notions of purity. Might this not then be the “feral waters” of a new *hydro-feminism*, a part of ecological feminism that focuses on the flows—imaginative, mythical, and physical—of the social life of water? Are we not all bodies of water?

Further Reading:

Alaimo, Stacy. *Bodily Natures: Science, Environment, and The Material Self*. Bloomington: Indiana University Press, 2010.

Berger, John. *Ways of Seeing*. London: Penguin Books, 1972.

Gaard, Greta. "Women, Water, Energy: An Ecofeminist Approach." *Organization & Environment* 14, No. 2 (2001): 157–172.

Illich, Ivan. *H₂O and the Waters of Forgetfulness*. Ideas In Progress. London: Marion Boyars Publishers, 1986.

Linton, Jamie. *What is Water?: The History of a Modern Abstraction*. Vancouver: UBC Press, 2010.

Sandilands, Catriona. *The Good-Natured Feminist: Ecofeminism and the Quest for Democracy*. Minneapolis: University of Minnesota Press, 1999.

Sawyer, Suzana and Arun Agrawal. "Environmental Orientalisms." *Cultural Critique* 45 (2000): 71–108.

Scharff, Virginia, ed. *Seeing Nature through Gender*. Lawrence, KS: University Press of Kansas, 2003.

Politics: Transformation of Landscapes

Ewald Blocher

Dammed Water: Water as a National Commodity

Introduction

“If the wars of this century were fought over oil, the wars of the next century will be fought over water,”¹ remarked World Bank Vice President Ismail Serageldin at the turn of the century. He is not alone in this opinion; many experts expect wars to be waged over the commodity water.² Considering that there are over two hundred major transnational river systems worldwide and approximately 40 percent of the world’s population lives on one of these cross-border rivers, the consequences of this could be severe.³ One such river system is located in the East African Nile basin: encompassing three billion square kilometers, it includes a total of ten bordering nations and a population of nearly 250 million people.⁴ Along the Nile, a multitude of water construction projects—either already underway or in planning—are damming ever increasing amounts of water to be “reserved” for various national objectives, resulting in a considerable potential for conflict in this region.

Since time immemorial, to dam water—in other words, to construct embankment dams to store large amounts of water—has consistently been a strategy to establish a habitable environment for humans and animals in arid regions. The first major embankment dam was erected in 2700 BCE to “tame” the Nile in Central Egypt. From that time on, controlling water, and with it nature, has been pivotal for guaranteeing human survival across the globe. In this context, one must also consider a further characteristic of water: as a good or commodity in and of itself. Having control over a

This essay was originally written in German and has been translated for the *Perspectives* by Rachel Shindelar. Unless otherwise noted, all translations of German sources are also the translator’s.

- 1 “Water,” on Ismail Serageldin’s official website, accessed on 16 March 2012, <http://www.serageldin.com/Water.htm>.
- 2 Terje Tvedt, “Some Conceptual Issues Regarding the Study of Inter-State Relationships in River Basins,” in *The River Nile in the Post-Colonial Age: Conflict and Cooperation among Nile Basin Countries*, ed. Terje Tvedt (London: I.B. Tauris & Co. Ltd, 2010), 237.
- 3 Frank Kürschner-Pelkmann, *Das Wasser-Buch: Kultur, Religion, Gesellschaft, Wirtschaft* (Frankfurt am Main: Lembeck, 2007), 269.
- 4 *Ibid.*, 324

waterway allows a local or regional community to claim territorial possession of it, as well as the water within it. In this context, the artificial damming of water signifies—at least for the time being—the localization and territorial fixation of water for the purpose of claiming dominion over it. Such an encroachment on a hydrological system, however, contradicts the fundamental nature of a body of flowing water, such as the Nile. Interferences of this kind not only change the river system, but also frequently result in the necessity for further artificial measures to absorb the unintended side-effects. As a result, hydraulic engineering has evolved into a means for continually “improving” the river, further compromising the innate character of naturally flowing water. Over the course of the twentieth century, the Nile has been gradually transformed from a scarcely controllable river into an irrigation canal.⁵

As the world’s longest river, the Nile cleaves its way from the central African highlands, through endless plains and deserts, across thousands of kilometers, to spill into the Mediterranean Sea. The natural environment that the Nile traverses is made up of different topographic and climatic zones; not only does the river flow from subtropical to arid regions but it simultaneously crosses artificially constructed borders. Like a lifeline, the Nile flows through numerous politically divided regions and, in the process, is cut up into smaller geographical pieces. The embankment dams or dammed waters along its course are a symbol of the appropriation of water as a *national* commodity.

Modernity and Space

A fundamental characteristic of modernity is the recognition of the nation-state as the basic unit for structuring, organizing, and controlling physical space. Although space has always played a role in human history as a physical component, it was not until the modern age that it won its political and ideological meaning in the form of *territory*. In the last five hundred years, the rise of the nation-state as the medium for political, economic, and cultural interaction on a supra-local level greatly contributed to the emergence of a spatially interpreted national “internal” and “external.” These centuries can be viewed as the era of territorial containment: the discovery of borders and territoriality. From here on, through the alignment with specific territories, individuals subordinated

5 This comparison can be found in Gamal Hamdan, *Shakhsyyat Misr* [The Character of Egypt] (Kairo: Anglo-Egyptian Bookshop, 1970), 254.

themselves to a central and sovereign authority. However, the true significance of territoriality goes beyond the recognition of borders; national territory is more than just a spatial localization, it is a tool for national power and dominion.⁶ This process intensified in the second half of the nineteenth century. A reconfiguration of the territorial state—amplified by widespread industrialization—took place: With the advancement of technology, territoriality became more and more a political and economic resource.⁷ By declaring itself lord of the “content” of a geographical space, the “state” served as supervisor of the national territory. Besides the human population, content especially included the natural resources or, in more general terms, the entire topography of the territory in its capacity as a source of material utility. This meant that all national resources—that is, those located within the territory—were understood to be national commodities and separate from those located outside the specified space.

An important factor in perceiving the content of national territory as a disposable commodity was the construction of causality between territory and national development.⁸ Thus, attributes of geographical territory are decisive for the welfare of the nation; they are the prerequisites for sustained national existence. Geographical space functions as a vessel that can be filled with content, in which historical acts unfold as a pre-conditioned and preexisting matter.⁹ From this perspective, a territory can be viewed as a living or a cultural space, as a *natural* “container.” This kind of determinism is still evident today, with the alleged natural and spatial trajectory of cultures and societies finding its justification in the notion that the rightful physical dimensions of states are ascertainable, as are the “natural” borders of a cultural area.¹⁰ By way of illustration, the following sentence could be found on the official website of the Egypt State Information Service in 2007: “Egyptians have associated themselves with the River Nile . . . since time immemorial.”¹¹ The message of such a statement is clear: We, as Egyptians, consider the Nile and its surrounding area as *our natural* habitat.

6 Charles Maier, “Consigning the Twentieth Century to History: Alternative Narratives for the Modern Era,” *American Historical Review* 105, no. 3 (2000): 817–8.

7 *Ibid.*, 815–6.

8 Jörg Dünne, “Soziale Räume: Einleitung,” in *Raumtheorie: Grundlagentexte aus Philosophie und Kulturwissenschaften*, ed. Jörg Dünne and Stephan Günzel, 1st ed., Suhrkamp Taschenbücher Wissenschaft 1800 (Frankfurt am Main: Suhrkamp, 2006), 289.

9 Marcus Sandl, “Geschichtswissenschaft,” in *Raumwissenschaften*, ed. Stephan Günzel, 1st ed., Suhrkamp-Taschenbuch Wissenschaft 1891 (Frankfurt am Main: Suhrkamp, 2009), 160–2.

10 Benno Werlen, “Geographie/Sozialgeographie,” in *Raumwissenschaften*, ed. Günzel, 148–9.

11 Birgit Näther, “Ägypten: Entwicklung durch nachhaltige Wasserpolitik,” in *Wasser im Nahen Osten und Nordafrika: Wege aus der Krise*, ed. Meike Janosch (Münster: Waxmann, 2008), 203.

Human beings use certain cognitive processes to determine their spatial environment. These processes allow us to orient ourselves in space and to describe an area in the first place. From this viewpoint, the spatially perceived environment of a human being is not a geographical or territorial reality, but rather the product of an intellectual process, which maps out space in our head. A mental map of this kind contradicts the idea of the territorial container as a predetermined cultural area. Regarding geographical space as the product of a cognitive, (sub-)conscious feat highlights that it isn't just a natural phenomenon with a preordained purpose—like the Egyptians' assertion that the Nile is their natural habitat—but rather, that geographical space is psychologically constructed and determined. From this cognitive point of view, relative perceptions of space are representative perspectives of the space. Each individual's perspective is linked to different identities, which in turn are part of the individual. Identities are critical in constructing perceptual patterns for interpreting space. As a result, competing identities can generate competing perceptual patterns.¹² The deciding moment that leads to the understanding of space as a container is the conscious and subconscious exploitation of a space and projection of personal perceptions thereon by individuals or groups.¹³ They “fill” the space with specific content.

The perception of space as a container implies, moreover, a specific relationship to nature. This spatial perception presupposes a separation of the human and space, in such a way that the human acts against the setting “space” and fashions it according to his or her own design. With regard to human environment, the setting “space” could just as easily be replaced by “nature.” However, instead of an untouched, pure nature there is a creatively and manipulatively constructed cultural landscape. Nature and humankind, nature and culture increasingly appear to coexist: the constantly growing sphere of man-made, processed, and manipulated nature on the one hand, and culture on the other. In other words, humanity's relationship to nature is instrumental and distanced, much like its relationship to space as a setting for human actions.¹⁴ This contributes significantly to the perceived separation between nature and culture. Nature becomes the object of human dominion.

12 Christoph Ulf, “Die Perspektive des Wasserraumes als soziales und kulturelles Konstrukt,” in *Wasser und Raum: Beiträge zu einer Kulturtheorie des Wassers*, ed. Doris G. Eibl (Göttingen: V&R unipress, 2008), 46.

13 *Ibid.*, 47f.

14 Nina Degele and Christian Dries, *Modernisierungstheorie: Eine Einführung*, UTB 2703: Soziologie (München: Fink, 2005), 116–7.

Certain academic views support this dichotomy. The emergence of mathematical and empirical experiments as the defining character of sciences in Europe in the fifteenth and sixteenth centuries changed mankind's perception of nature. Until the Middle Ages, the overriding perception of nature had been formed by ancient philosophy; according to the divine order of nature, man could acquire knowledge (contextual knowledge), but he neither could, nor should attempt to change or create it. Later, understanding nature for its own sake was no longer at the center of contemporary thought, but rather the practice of using scientific methods and experiments to study natural laws and relationships for the purpose of improving the conditions of humankind. The ancient concept of contextual knowledge was replaced by instrumental knowledge; nature was no longer explored according to the question of "what" but "why." This academic approach is based on the dualism between animate and inanimate matter, a separation of the world into subject and object.¹⁵

The ideology of the dualism of subject and object, of mentally inside and materially outside, can be traced back to the seventeenth-century French philosopher and mathematician René Descartes. He expressed a fundamental doubt of the reality of the outside world in his work. Descartes placed the skeptical and thinking "Ego" at the center of the epistemological acquisition of knowledge, laying the cornerstone for the subjectification and objectification of reality. Shifting focus to the internal, thinking Ego as a basic epistemological category had fundamental consequences for the modern scientific understanding of nature; human intelligence won unprecedented appreciation. Therefore, according to Descartes something can only be identified—that is, academically and objectively described and predicted—if it is determined through those strict intellectual concepts and mathematical laws that are tested and protected by methodical doubt. This implies an objectification and reification of nature; nature becomes an object, whose definition and image is dependent on the interpretation of a subject. Everything is objectified: animals, the human body, the world as a whole, everything is classified according to the binary logic of the Cartesian system.¹⁶

A distance evolves between the observer and the observed, which is bridged by means of perceiving the world in the form of representations. Descartes describes this process of visual perception with the help of the *camera obscura*, which projects the light

15 Ibid., 124–5.

16 Ibid., 126.

of the outside world, through a hole in the wall, onto the opposite side of a dark room and thereby produces observable *images* of the world.¹⁷ This same act of measuring and reproducing is accomplished by the sciences; they construct representations of the environment by means of experiments and (simplified) depictions, which (allegedly) perfectly reproduce nature and its processes.

In summary, the cognitive construction of space allows for the conceptualization of a territorially limited and culturally determined entity. With the help of scientifically anchored processes, everything enclosed inside this entity is disconnected from its natural environment—which in reality frequently expands beyond the newly conceived spatial limits—and is connected to a territorial identity.

The spatial and scientific determination of water that takes place in hydraulic engineering is a prime example for both of these processes. Hydraulic engineering has a dual role as a “spatial science”: On the one hand, through the building of dams as a means to control a resource it verifies the physical and material capacities of space and appropriates the collected water to a proprietor. On the other hand, as a science—in a very Cartesian sense—it illuminatingly releases water from its natural environment by scientifically depicting it as an object that can be described by means of surveying and representational practices. In doing so, water becomes an object that is spatially defined and detached from its natural environment: a national commodity.

Territorializing the Nile

With the transition of Egypt and Sudan into nation-states in the mid-1950s, the current territorial organization of the Nile Valley was achieved. The topographical “unit” of the Nile Valley as a whole was definitively broken up and divided into smaller geographical units. The Nile continued to function as a “lifeline” solely because it had technically and scientifically been adapted to respective national needs—because it had been optimized to meet the demand of the littoral states for water, at least temporarily. However, especially in Cairo (Egypt demands by far the largest portion of the Nile’s resources), it was clear that this temporary state of affairs was not acceptable, given the nation’s ambitious

17 Stephan Günzel, “Physik und Metaphysik des Raums. Einleitung,” in *Raumtheorie: Grundlagentexte aus Philosophie und Kulturwissenschaften*, ed. Jörg Dünne and Stephan Günzel, Suhrkamp Taschenbücher Wissenschaft 1800, 1st ed (Frankfurt am Main: Suhrkamp, 2006), 21–2.

modernization and industrialization plans and constantly increasing population. Due to advanced African decolonization and the resulting national and territorial autonomies, Egypt's traditional interpretation of the Nile Valley as a single hydrological entity under its civil and cultural leadership could no longer be maintained. By then, even in Africa an independent and internationally recognized sovereign nation-state was perceived as the basis for social, economic, and political life.

Accordingly, the Nile was also underwent constructive "territorialization." Although British hydraulic engineers might have envisioned the Nile Valley as a single hydrological unit in their comprehensive project plans during the British Empire, this was now the middle of the twentieth century and such an interpretation had no place in the nationalized spatial perceptions of the governments of the Nile riparian states. Numerous generations of engineers had used hydraulic engineering technology to measure and define the Nile down to the last detail. A "second" Nile was composed on paper from an endless amount of tables and statistics on water levels and flow rates for multiple points along the Nile; countless topographical maps and plans; and diagrams and technical drawings of dams, canals, and dikes from a period of nearly one hundred years. An allegedly accurate and realistic copy, a "reproduction," of the Nile emerged.

The scientifically and technically produced duplicate of the Nile had to be adapted to contemporary national configurations, to the modern reality of the Nile Valley. In the second half of the twentieth century armies of experts and engineers—both national and international, of which, in contrast to the British hydro-engineers at the turn of the century, only a few had ever seen and studied the Nile Valley in person—began to draft national development strategies that would enable nationally optimized water usage. New dams were added to the numerous existing ones along the river, which all fit seamlessly to the newest economic concept of modernization. According to the recently developed models, the damming and diversion of more and more water was completely unproblematic. The Nile itself became a model, which could be arbitrarily taken apart and put back together appropriately in agreement with scientific and engineering rules. This meant that in the case of the Nile, the aforementioned natural character of a river appeared to be nullified by its "fragmentation" and its model-like character in the eyes of politicians from littoral states. From then on the highest priority of hydraulic engineering along the Nile became the utility of water inside political borders, fundamentally contradicting the river's hydrological reality. With regard to

the Nile Valley as a harmonious hydrological unit, the riparian countries choose to concentrate on projects for national water usage instead.

The Aswan High Dam is probably the most striking and the most gigantic example of the Nile Valley reconfiguration: a massive Egyptian project, which was constructed in the 1960s with little concern for neighboring states or for the hydrological and ecological characteristics of the Nile basin. The project quite clearly conformed to a national spatial perception of the Nile and was entirely tailored to Egypt's demands. It was the attempt to construct an "Egyptian Nile," which is fed separate from its origin in the African equatorial highlands from an artificial source: a man-made lake behind the dam, one of the world's largest reservoirs today. It was a project based on political premises and scientifically fabricated representations of reality.

Behind these representations, the "real" Nile, and with it an ecosystem that has long ago reached its limits, due to continual hydraulic engineering projects and constant population growth, is hiding. These are the limits of a nationally perceived and used resource, which is based on the supposed accuracy of image-production. The reality of water in the Nile Valley as a commodity is, however, supranational. To this day, political reality and physiographical reality are not consistent. In 1999, all the states along the Nile came together to launch the *Nile Basin Initiative*, intended to bring about cooperative structures for a solution to the water distribution question. Despite the transnational nature of this and similar initiatives, the national representatives continue to act according to their allegiances: Egyptian envoys speak for Egypt, Sudanese for Sudan, Ethiopian for Ethiopia, etc. This may be a reason why the previous achievements of the current initiative are still relatively small. However, this obligation also signalizes a willingness to find a collective solution to the water question; and, more importantly, the realization that this is the only viable way.

The implied inevitability of wars over water in the aforementioned statement of the World Bank Vice President is, therefore, by no means predetermined. It is *one* possibility, but not the only. The Nile Basin Initiative, which had been preceded in the 1970s and 1980s by repeated bellicose rhetoric, especially between Egypt and Ethiopia, is proof of this. A cultural and historical analysis of the recent past of the Nile Valley shows how interpretations and perceptions of territory, space, and nature can evolve, and that these are not necessarily indisputably "true" and definitive principles.

On the contrary, they are constructed and, therefore, changeable. The Nile initiative of the riparian states—admittedly in its infancy—shows how those perceptions of space, which understand water as a national commodity, can *change*. This is only a first step, but a step into a not-so-threatening future.

Further Reading

Eibl, Doris G., ed. *Wasser und Raum: Beiträge zu einer Kulturtheorie des Wassers*. Göttingen: V&R unipress, 2008.

Günzel, Stephan and Franziska Kümmerling. *Raum: Ein interdisziplinäres Handbuch*. Stuttgart: Metzler, 2010.

Tvedt, Terje, ed. *The River Nile in the Post-Colonial Age: Conflict and Cooperation Among the Nile Basin Countries*. London: I.B. Tauris, 2010.

———. *The River Nile in the Age of the British: Political Ecology and the Quest for Economic Power*. London: I.B. Tauris, 2004.

Alexa Weik von Mossner

Rising Waters: Submersion and Survival in Yung Chang's *Up the Yangtze*

A luxury cruise boat slowly moves upward in a lock, lifted gently by the rising water level in the chamber. Some of the passengers watch the spectacle from the upper deck, and, with them, we anticipate the view that awaits us on the upper level of the lock. At first we see only a small section of pale blue sky, but once the boat has reached the 95 meter mark the surrounding landscape gradually appears: concrete, some grass, and a few scattered trees. The dominating feature, however, is dozens of power poles and hundreds of crisscrossing transmission lines that seem to cut the hazy sky into tiny little pieces.

The pacing of this opening sequence of Yung Chang's 2007 documentary film *Up the Yangtze* is slow, almost elegiac, and it prepares us for the story we are about to be told, a sad story of longing, loss, and absurd luxury on the mighty Yangtze river.¹ It is also a story about power—electrical as well as economic and political power—and about what it means to have little or no power at all over one's life and the place in which one lives. The film was shot in 2006, shortly after the completion of the body of the Three Gorges Dam in Central China, currently the largest hydro-electric power project in the world. The film's first images—the slow upward movement of the camera as it rises with the cruise boat in the water lock—mimic the rising waters of the Yangtze that slowly but inexorably swallow and drown everything along its banks. Thus far, an estimated 1.3 million people who lived along these banks have been displaced and “resettled” as the water level slowly rises over 175 meters.²

1.3 million people is an enormous, almost unfathomable number, and *Up the Yangtze* attempts to give it a human face by offering us a glimpse into what it means for individual people to have to come to terms with the fact that the places where they live will soon be under water. The film records both the slow submersion of landscapes and cities, and the strategies for survival used by the soon to be displaced people who are at the heart of the film. Almost paradoxically, however, there is something else that

1 Yung Chang, *Up the Yangtze*. (Canada: Eye Steel Film/National Film Board Canada, 2007), Filmstrip, 95 min.

2 Chang speaks of “an estimated two million people” in his film, but 1.3 million is the number that most experts currently agree on. There are indicators, however, that this number will continue to rise as emerging environmental problems in the region will necessitate the relocation of additional people.

survives in the virtual space of the film: the landscapes, towns, and cities of the region that, by now, have long been submerged by the waters of the Yangtze.

“Imagine the Grand Canyon being turned into a big lake,” suggests Chinese-Canadian filmmaker Chang in the first minutes of *Up the Yangtze* to give an idea of the magnitude of the Chinese project. According to International Rivers, the Three Gorges Dam is not only the world’s largest hydropower project but also its “most notorious dam. The massive project sets records for number of people displaced (more than 1.2 million), number of cities and towns flooded (13 cities, 140 towns, and 1,350 villages), and length of the reservoir (more than 600 kilometers),” and it is at the same time notorious for “corruption, spiraling costs, technological problems, human rights violations, and resettlement difficulties.”³ The environmental impacts of the project are also profound, and most experts agree that they are likely to get worse as time goes on. Not only will hundreds of submerged factories, mines, and waste dumps likely produce massive pollution problems, but there are also concerns over increased soil erosion and resulting landslides, as well as possible reservoir-induced seismicity.⁴

The area affected also includes 108 historical and cultural monuments, and this is why the Three Gorges Project has also produced a lucrative new form of disaster tourism, which gave Chang the idea for his film. The son of first-generation Chinese immigrants to Canada began working on the script in 2002 when he went on one of the so-called “farewell tours” along the Yangtze. These tours offered affluent tourists from around the world a chance to visit the area before it disappeared in the floods. He found the experience “very surreal,” especially after he realized that “the people working on the boat were all from the Yangtze area, and that many of their families were affected by the dam.”⁵ He decided to make a film about some of these people who accompanying the rich passengers on their apocalyptic journey through a disappearing “ghostlike” landscape, while their own families are struggling with the fact that their homes will soon be flooded.

3 “Three Gorges Dam,” International Rivers, accessed on 9 May 2011, <http://www.internationalrivers.org/china/three-gorges-dam>.

4 Ibid.

5 Chang makes this statement in an interview that has been published in the film’s press kit. “Yung Chang Interview.” *Up the Yangtze Press Kit*, accessed on 11 May 2011, http://www.uptheyangtze.com/medias/extras/UTY_press_kit.pdf.



Figure 2(l):
The Yu family's
shed (Reprinted by
Permission from
Chang, *Up the
Yangtze*, 2007)

Figure 1(r):
Cruise boat on
the Three Gorges
(Reprinted by
permission from
Yung Chang, *Up the
Yangtze*, 2007)

Chang tells the story of the Yu family: illiterate, poor people who live in a little shack next to the river not far from the ghost city Fengdu, and of their 16-year old daughter Yu Shui, who speaks English well enough to get a job on one of the cruise ships. While her parents and two siblings struggle to feed themselves by growing vegetables on the river bank, Shui becomes “Cindy” to make things easier for the western passengers, and soon plays her small part in the highly profitable business of the farewell tours. The contrast between passengers and staff, between the luxury of the boat and the Yu family’s miserable shack on the river bank, could hardly be more extreme. People from the United States, Canada, Europe, Japan, and other parts of the world have booked this tour because they “want to wave good-bye before it all disappears.” Shui works for them because her parents have asked her to. They desperately need the money not only because health and school expenses have put them in severe debt, but also because the water is coming closer every day, and in their new urban habitation they will no longer be able to grow their own food.

Chang relies on powerful and often poetic images to convey the gradual submersion of the landscape on the one hand, and the culture clash between poor rural inhabitants and international tourists on the other. He mostly refrains from commenting on these images, leaving it to the viewers to puzzle together the story of environmental transformation and social injustice presented to them. The drama emerges from the doomed landscapes themselves and from the faces and voices of his protagonists. But this, of course, does not mean that his film simply “documents” the world he encountered during the principal shooting of the film between May and December 2006. “To take the documentary film as a mere photographic document,” argues film scholar Carl Plantinga, “ignores the ‘creative shaping’ that is an ineluctable element of all documentary films, and that occurs in diverse registers such as narrative or rhetorical

structure, editing, cinematography, [and] sound design.”⁶ Plantinga maintains that although documentaries may make use of documents, it is a problem if we reduce them to the provision of *documentation*, because such an understanding neglects the manifold ways in which documentary filmmakers actively frame and shape the filmic worlds they present to their audiences. Watching a documentary—even an unobtrusive one like Chang’s *Up the Yangtze*—we have to keep in mind that, like fiction films, they are creative cultural texts and the product of directorial choices. The special appeal of the documentary form lies in its very power to “seduce” us into believing that we watch an “objective” account of the events presented to us and that it “simply allows the filmed subjects to ‘speak for themselves.’”⁷ This appearance of objectivity and immediacy is the main reason why documentaries are so often the weapon of choice for filmmakers who want to offer alternative perspectives on accepted “realities.”

Presenting such an alternative perspective on the gargantuan Three Gorges Dam is certainly one of the things that Chang had in mind when making his film. He took almost a full year getting to know the Yu family before he and his Chinese camera team started principal shooting. “By the time we got the camera out,” he explains in an interview, “they [the family] had come to trust us.”⁸ This relationship of trust between the filmmakers and their protagonists is obvious in the film, and it allows Chang to show the development of the dam and Shui’s work on the cruise boat from the perspective of those who are personally affected by the rising waters, and to have the story told through *their* voices, which are otherwise rarely heard or listened to. Shui herself does not say a lot; most of what we learn about her work on the cruise boat is conveyed through observation of her daily routine. Her father, on the other hand, is very willing to talk about his view of his family’s situation in the film: “When the water rises,” he says quietly as he looks out on his tiny piece of land, “and [when] the Three Gorges gate closes, where can you farm? You can’t even have a life.”

The latter is often quite literally true, and it in fact is one of the most serious problems of the vast relocation project pursued by the Chinese government. Yan Tan and Fajun Yao remind us in a 2006 article in *Population and Environment* that 42.7 percent of the

6 Carl Plantinga, “Documentary,” in *The Routledge Companion to Philosophy and Film*, ed. Paisley Livingston and Carl Plantinga (London: Routledge, 2005), 495.

7 Jasmine Nicole Cobb and John L. Jackson, “They Hate Me: Spike Lee, Documentary Filmmaking and Hollywood’s ‘Savage Slot,’” in *Fight the Power! The Spike Lee Reader*, ed. J. D. Hamlet and R. R Means Coleman (New York: Peter Lang, 2009), 263.

8 “Yung Chang Interview.” *Up the Yangtze Press Kit*, 5.

people to be relocated are rural residents, and that “due to a shortage of cultivated land, a fragile physical environment, and an underdeveloped economy, the challenge of successfully resettling all rural residents in the reservoir area is huge.”⁹ In many cases the challenge will not be met. “The official view in China is that the dam is good for the nation,” explains Chang in the interview. “As for the suffering of people like the Yu family, the standard line is the small family must sacrifice to help the big family—the nation.” However, for poor and uneducated people like the Yu family, this sacrifice has existential dimensions. What is more, adds Chang, “all serious studies show that mega-dams like the Three Gorges ultimately have greater negative effects than positive. . . . They cause terrible damage to the environment and destroy the livelihoods of local people. You see this already along the Yangtze—the pollution and silt buildup, the disappearance of certain species like the Baiqi Dolphin, and the hardship caused to so many people.”¹⁰ These are the issues Chang wants to draw attention to with his film.

In his review of *Up the Yangtze* for the *New York Times*, Stephen Holden notes that the film tells a story of “culture clash and the erasure of history amid China’s economic miracle.”¹¹ The culture clash is between what Holden calls the “old China” and the “new China,” and it is also between the powerless poor and the international tourists, who watch the river banks through glass panes while getting some exercise on the cruise boat’s high-tech ergometers. Perhaps these tourists would begin to care about the existential struggles of the local people, and the enormous ecological and social challenges posed by the Three Gorges Dam, if they were able or willing to see beyond the drowning cultural sites the tour organizers have lined up for them. As it is, however, they merely enjoy the eerie shadow of doom that lingers over the ancient ghost town of Fengdu and other highlights of the tour, remarking dryly in Chang’s film that “China is even more modern than [we were] expecting to see,” but that “the poverty and the rural life is still very visible also.” In the context that the film builds for its viewers, such well-meaning statements sound cynical at best. *Up the Yangtze* helps its viewers understand what exactly this poverty looks like in the Yangtze region and what it means to be “relocated” against one’s will from the place where one has been making one’s living. Once again, it doesn’t do this by giving us detailed background

9 Yan Tan and Fajun Yao, “Three Gorges Project: Effects of Resettlement on the Environment in the Reservoir Area and Countermeasures,” *Population and Environment* 27, no.4 (2006): 353.

10 “Yung Chang Interview,” *Up the Yangtze Press Kit*, 5.

11 Stephen Holden, “A Visit to Old China, Before It Drowns,” *The New York Times*, 25 April 2008, accessed on 10 May 2011, <http://movies.nytimes.com/2008/04/25/movies/25yang.html>.

information or expert opinions, as many other documentaries would. Instead, Chang lets the people speak for themselves. “You just can’t help it,” says a young shopkeeper in one of the many cities that will be flooded. “It’s hard being a human, but being a common person in China is even more difficult.” And then he breaks down crying, talks about how he was beaten by the local police when he had to move.

Moments like these, which have a remarkable intimacy, give the film part of its emotional strength. The other part comes from the many wide-angle landscape shots that linger for some time on the river and its banks, accompanied only by music. Stephen Holden notes that “as the boat sails upriver, the landscape is spectacular;”¹² and indeed, Chang dedicates a good amount of film time to showing us the strange beauty of the Yangtze landscape, which, as Holden also points out, is marked by a “yellowish haze over the water,” which “suggests China’s already serious air pollution problem.”¹³ But even as it celebrates the beauty of the landscape, the film constantly reminds us of its future fate. Again and again we see signs along the river banks that start at 55 meters just above the water surface and go all the way up to 175 meters—the estimated final water level once the dam is completed and the reservoir filled up.

Figure 3 (l): View of the water level markers (Reprinted by Permission from Chang, *Up the Yangtze*, 2007)



Figure 4(r): Visiting the Three Gorges Dam with the Yu family (Reprinted by Permission from Chang, *Up the Yangtze*, 2007)



Towards the end of the movie, the filmmakers bring Shui’s parents to the nearly finished Three Gorges Dam, confronting them with the enormous structure that will change their lives forever. They cannot really grasp it and the amount of electrical power it will produce. They have never had electricity in their little home by the river. As the cruise boat moves on, Shui’s father returns to the family home and on his back carries every single piece of furniture the family owns up the newly built bank reinforcement. Then the Yu family moves into its new home, a much larger room than they used to have, but still

¹² Stephen Holden, “A Visit to Old China.”

¹³ Stephen Holden, “A Visit to Old China.”

without electricity and water, and, what is even more important, without land they could use to grow food. Their old home remains behind on the bank of the Yangtze. In one of the most impressive and memorable sequences of the film, we are invited to witness what is happening everywhere along the Three Gorges Reservoir: a stop-motion montage shows in time-lapse the Yu family's field and shack as they are slowly swallowed by the rising water of the river. In the end, they are completely gone, and the only trace that will remain of them and many other landscapes in the Three Gorges region is people's memories, stories, and images—and documentary films like Chang's *Up the Yangtze*.

Further Reading

Chang, Yung. *Up the Yangtze*. Canada: Eye Steel Film/National Film Board Canada, 2007. Film-strip, 95 min.

Cobb, Jasmine Nicole and John L. Jackson. "They Hate Me: Spike Lee, Documentary Filmmaking and Hollywood's 'Savage Slot.'" In *Fight the Power! The Spike Lee Reader*, edited by J. D. Hamlet and R. R Means Coleman. New York: Peter Lang, 2009.

Plantinga, Carl. "Documentary." In *The Routledge Companion to Philosophy and Film*, edited by Paisley Livingston and Carl Plantinga. London: Routledge, 2005.

Tan, Yan and Fajun Yao. "Three Gorges Project: Effects of Resettlement on the Environment in the Reservoir Area and Countermeasures." *Population and Environment* 27, no.4 (2006).

Julia Herzberg

The Domestication of Ice and Cold: The Ice Palace in Saint Petersburg 1740

The winter of 1739/40 was particularly severe, with the whole of Europe caught in its icy grasp. Frozen birds fell from the branches of trees, firewood became scarce, and many regions faced the threat of starvation. Due to the fact that social inequality was tempered for the first time in Western Europe through advanced precautionary measures, this winter is considered a triumph of the enlightenment. As numerous local studies have shown, efforts to avoid famine were successful in many regions.¹

The winter also unleashed its full fury on Russia and, not surprisingly, left traces in eyewitness reports and memoirs from the time. However, it is worth noting that those authors who write about their time in Saint Petersburg hardly make an issue of problems or fears experienced. They report neither precautionary measures taken in advance nor difficulties in maintaining supply. Their attention is focused instead on an ice palace, which shone resplendent on the Neva River from January until March 1740.

This ice palace, the construction of which required only solid and liquid water, was, according to the Professor of Physics Georg Wolfgang Krafft, in keeping with “all the rules of the most modern architecture.” Building blocks of the purest ice were placed on top of each other and decorated with all kinds of ornamentation. Liquid water was used as cement, which fastened the blocks of ice firmly together. With windows, doors, and an outdoor staircase, the palace left nothing to be desired. Inside there were orange trees, mirrors, a corner cupboard, and a magnificent bed. Beside the bed there was even a pair of slippers, although anyone attempting to slide into them soon found themselves with extremely cold feet, for not only the palace walls but indeed every item in and around the building was made entirely of ice.² Much pleasure was also derived from the two dolphins that stood at the entrance to the palace spraying

This essay was originally written in German and has been translated for the *Perspectives* by Kerry Jago. Unless otherwise noted, all translations of German sources are also the translator's.

- 1 Wolfgang Behringer, *Kulturgeschichte des Klimas: Von der Eiszeit bis zur globalen Erwärmung* (München: Beck, 2007), 210–11.
- 2 The most detailed description of the ice palace is provided by Georg Wolfgang Krafft. Georg Wolfgang Krafft, *Wahrhafte und Umständliche Beschreibung und Abbildung des im Monath Januarius 1740 in St. Petersburg aufgerichteten merckwürdigen Hauses von Eiß* (Saint Petersburg: Kayserliche Academie der Wissenschaften, 1741).

burning oil from their mouths. The elephant made of ice on the right-hand side of the palace also attracted many admirers; it was not only able to spray water, but could also make noises like “a natural” elephant—hidden in its cold, hollow belly was a person equipped with a trumpet.

The ice palace was part of the festivities put on by Tsarina Anna Ivanovna to celebrate the victory over the Turks. The unusual attraction also became the scene of an unusual event when Prince Michail Golitsyn was forced to perform serving duties. Tsarina Anna—who, like Peter the Great, possessed a host of court jesters—had demoted the prince to the role of a jester as a punitive measure.³ Golitsyn had fallen out of favor after marrying a Catholic Italian while on a foreign trip and converting to her religious faith. Upon his return, the Tsarina Anna Ivanovna demanded that he remarry. She agreed to cover the financial costs herself, but chose a Kalmyk woman to be his wife. Some historians claim that she was old and ugly.⁴

The preparations for this wedding were elaborate and were by no means exhausted with the construction of the ice palace. The Tsarina had a couple from every province of her empire accompany the wedding procession in traditional tribal dress. A colorful wedding procession of Yakuts, Lapplanders, Samoyedic peoples, Mordvins, and Tatars escorted the bride and groom through the streets of Saint Petersburg. The exotic nature of these tribes for the people of the capital was further highlighted by the fact that their representatives rode in sleighs pulled along by pigs, dogs, wild boars, and elk. The bride and groom themselves travelled through the city seated in a cage that was strapped to the back of an elephant. The wedding banquet also emphasized the diversity of the ethnicities that lived under Anna’s rule; the various couples each received a different meal in accordance with the tradition of their respective peoples. Following the end of the ball, the wedding procession moved on to the ice palace, where the newly-weds were presented with their bed of ice for their first night together. Guards were placed in front of the doors to prevent the happy couple from attempting to flee the pleasures of their wedding night.

3 Further on the role of jesters at the court of Peter I and Anna see: Jewgenij Anissimow, *Frauen auf dem russischen Thron*, trans. Gennadi Kagan (Wien: Pereprava, 2008), 109–12; Philip Longworth, *The Three Empresses: Catherine I, Anne and Elizabeth of Russia* (London: Constable, 1972), 122–23; Christopher Marsden, *Palmyra of the North: The First Days of St. Petersburg* (London: Faber and Faber, 1942), 95–6; Jelena Pogosjan, “I nevozmožnoe vozmožno: Svad’ba šutov v ledjanom dome kak fakt oficial’noj kul’tury,” *Trudy po russkoj i slavjanskoj filologii. Literaturovedenie* 4 (2001): 80–109.

4 James Hadley Billington, *The Icon and the Axe: An Interpretive History of Russian Culture* (London: Weidenfeld & Nicolson, 1966), 187.



Figure 1:
The wedding
procession (Brok-
gauz and Efron,⁵
Ledjanoj dom” in
*Entsiklopediches-
kaia slovar’*, Vol.
17 (St. Petersburg
1896), 483)

It was particularly those who were not personally present at the festivities who described the ice palace and the fool’s wedding as a blatant demonstration of the allegedly sadistic tendencies of the Tsarina and the sinfulness of the autocracy. Historians have also used the episode of the ice palace to portray Anna Ivanovna as a figure who frivolously indulged her cruel fancies and pleasures.⁵ Neither the construction material of the ice palace nor its location upon the Neva play an important role in interpretations to date, with the severe cold also not featuring prominently. In my paper, I will place the focus upon frost and ice as essential conditions of the celebration, since the main location of the festivities was indeed the ice palace. I argue that the events surrounding the ice palace were different from other baroque festivals in that the cold became a means with which autocratic rule could be legitimized and power represented. In conclusion, I will use the interpretations of the ice palace episode arising from the period following it to show that it was precisely the medium of ice, which cannot defy warmth and sun indefinitely, that undermined a successful and lasting presentation of power.

5 The British science historian Simon Werrett and the literary scholar Jelena Pogosjan are the only academics so far to have offered interpretations that contradict this one-sided view. In his dissertation, Werrett interprets the events surrounding the ice palace as an occurrence through which the scholars of the Academy of Sciences hoped to raise awareness of their experiments and research, while the ball of the various tribes is seen as an opportunity for the Saint Petersburg elite to underscore their own high level of civilization. Pogosjan’s approach is more descriptive, offering an overview of the planning process that preceded the fool’s wedding. According to Pogosjan, the parade of the tribes was an attempt by Anna to demonstrate the extent of her empire. Simon Werrett, *An Odd Sort of Exhibition: The St. Petersburg Academy of Sciences in Enlightened Russia*, Dissertation (Cambridge, 2000); Pogosjan, “I nevozmožnoe vozmožno,” 80–109.

The peace festivities, of which the ice palace formed the centerpiece, can be understood as a signal from Anna to her subjects that a long, drawn-out phase of uncertainty—the war against the Turks—was at an end. The backdrop constructed for the fireworks, which were set off on the last day of the celebrations (17 February 1740), sums up well the basic idea of the festival. In the middle and on the right-hand section of the stage, which was designed to portray a temple, female figures were positioned, easily be interpretable as personifications of Anna. Enthroned in the middle was Minerva, announcing with an inscription that “the safety of the Empire” had been restored. The right-hand side of the ceremonial temple seems to me to be the most important, where a goddess sits with a cornucopia. Above her appears the inscription “mir vosstanovlen.” The wording here has a double meaning, with the Russian word “mir” translating as either “world” or “peace.” Depending on the way in which it is interpreted, the inscription announces that “peace” or “the world” has been restored.⁶ The dramaturgy of the festival supports a preference for the second interpretation, according to which the world has been restored to the correct order of things. All of the festive symbols here involve a reference to Anna. She—according to the official message—is the only one who can guarantee order, welfare, and stability. This comprehensive claim to authority and rule on the part of Anna was clearly made visible and brought to bear on three levels: relations with subjects, space, and climate.

The Disciplining of the Aristocracy

The aristocracy, which, at the beginning of Anna’s rule, had attempted to catch her off guard and force her to accept a form of oligarchic, shared rule, was firmly put in its place by this festival. This involved a confirmation of the validity of those social norms that the aristocracy had hoped to sidestep. The public disciplining of the aristocracy was carried out in exemplary fashion upon Prince Michail Golicyn, whose conversion to the Catholic faith had tarnished the reputation of Tsarist Russia as a stronghold of Orthodox religion, and whose forefathers had failed once before in the struggle for the welfare of the Fatherland. Numerous contemporaries emphasize the fact that Golicyn was indeed being punished for his blunder by means of the fool’s wedding. He was publicly humiliated with no way of shielding himself from the eyes of all around him. In the event of public

6 Dmitrij A. Rovinskij, *Obozrenie ikonopisanija v Rossii do konca XVII veka. Opisanie fejerwerkov i illjuminacii* (Saint Petersburg: A. S. Suvorin, 1903), 222–3.

degradation, the fool's wedding held by Anna was decidedly different from the festivities put on by Peter the Great. In Peter's jester festivities the court functioned not only as a group of onlookers, but also took active part in the proceedings. In the case of Anna, the public humiliation was taken to the extreme through the transparency of the ice palace, in which the involuntary groom was to experience the intimate moment of the wedding night with the bride whom he had been forced to marry.

Eyewitnesses considered the fact that Michail Golicyn was stripped of his family name during his servitude as a jester to be perhaps the most monstrous element of the punishment. One of the tasks of the degraded prince from the well-known aristocratic house of the Golicyns was to hand the Tsarina the pitcher of kvas, a drink made from fermented bread. He was only allowed to be called by his first name, or by the name of "Kvasnik." This derogatory name even appears in public documents. The choice of the prince from the house of Golicyn was no coincidence. Kvasnik's grandfather was Vasilij Golicyn, whose military campaigns against the Khanat, allies of the Ottoman Empire, in the Crimea in 1687 and 1689 ended in comprehensive defeat.⁷ In a similar manner to the victory over the Turks, the humiliation of the house of Golicyn delivered a powerful sense of satisfaction. The gratification stemming from a publicly visible defeat was—as Anna emphasized in her opening address—the prerequisite for the restoration of peace and the world.⁸ Furthermore, one must agree with the French diplomat de La Chétardie that the degradation of the prince constituted a message from Anna to her subjects, and particularly to the aristocracy: she alone had the power to dispense prestige and shame.⁹ Through the fool's wedding, Anna presented herself as the central figure of the realm who could guarantee security.

Colonization of Space

The demonstration of power on the part of the Tsarina concerned not only the relations with her subjects, but also the size of her realm. The festivities were an attempt

7 Pogosjan, "I nevozmožnoe vozmožno," 80–109.

8 Ernst von Münnich, *Die Memoiren des Grafen Ernst von Münnich*, reprinted with an introduction and author's biography by Arved Jürgensohn (Stuttgart: J. G. Cotta, 1896), 153.

9 Markiz de-la-Šetardi, *Pis'mo Markiza de-la-Šetardi iz Peterburga 1-go Marta/19-go fevralja 1740 g., in Markiz de-la-Šetardi v Rossii 1740-1742 godov: Perevod rukopisnykh depeš francuzskago posol'stva v Peterburge*, ed. P. Pekarskij (Saint Petersburg: Ogrizko, 1862), 55–64.

to achieve a spatial restructuring of the city and the empire through the appropriation of the unknown for the autocracy. This applies firstly to the river Neva, which particularly in its liquid state—according to the theories of Marc Augé—can be described as a *non-place*.¹⁰

A river, in its materiality, is an entity that primarily enables movement. Even in winter, when the water of the river solidifies due to the freezing temperatures and becomes accessible on foot, the Neva is not a place where one spends time but rather a location of transit. Through the ice palace, which rose up in the middle of the frozen river, this non-place was annexed as a territory in its own right. This appropriation corresponded with the founding of the city of Saint Petersburg in 1703 in a swamp region. The ice palace symbolically extrapolated the shift of the center of Tsarist Russia's power northwards from Moscow to Saint Petersburg and, thus, into cold and uninhabited regions.

The domestication of unknown regions was also symbolized by the parade of the various tribal groups. The diverse peoples presented as subjects of Anna were done so in a manner that displayed their foreignness to its full extent, such as their appearance in traditional dress and the playing of their traditional music. This was a clear reference to the vastness of the empire and the success of expansion and “inner colonization.” This corresponds with the efforts of the Academy of Sciences at the time to produce a map of the whole empire and thus to appropriate distant regions of the Tsarist Empire through visualization.¹¹ Simultaneously—and this was surely a signal not only to the onlookers, but also to the Yakuts, Ukrainians, and Tatars who made up the procession—this was a gesture clearly indicating that the indisputable center of the empire was indeed in Saint Petersburg. Here was the place where the extent of the empire could be experienced firsthand. The festival also formed a part of the consolidation of Saint Petersburg as the new capital. The canons and mortars made of ice, which surrounded the ice palace, reinforced the claim to expansion and inner colonization. Their potential to represent a threat was enormous, since they could so easily be made from water. In all the descriptions of the ice palace, these canons—along with the fact that they could be used to shoot real ammunition—feature very prominently.

10 Marc Augé, *Orte und Nicht-Orte: Vorüberlegungen zu einer Ethnologie der Einsamkeit*, 2. ed. (Frankfurt a. M.: S. Fischer, 1994).

11 Longworth, *The Three Empresses*, 143.

The festival reflects the ambitions of the monarchy to appropriate for itself that which was unknown, even if it was very distant. This is particularly evident in the essay by Georg Wolfgang Krafft entitled *Wahrhaffte und Umständliche Beschreibung ... des ... merckwürdigen Hauses von Eiß* (Truthful and detailed description ... of the ... remarkable house of ice), which he published in 1741. In it, he describes the ice palace as an embodiment of the conditions on the planet Saturn: on Saturn, there are such ferociously cold temperatures that all water has the consistency of marble and the inhabitants of Saturn can use frozen water for the construction of their “huts.” Krafft expresses regret at the transience of the ice palace, for which Saturn would have been a more appropriate location.¹² The ice palace transformed Saint Petersburg into an outpost of Saturn.¹³

Cold and Climate

Through the medium of the festival, it was not only the rebellious aristocracy and the vastness of physical space that were portrayed as enemies that could only be conquered by such a powerful Tsarina as Anna. The winter too, and even the climate in general, underwent a metamorphosis from being a virtually insurmountable danger to a risk that could be brought under control. The symbolism of the peace celebrations emphasized the idea that neither powerful enemies from inside or outside the empire, nor the power of nature were able to disturb the natural order and encroach upon Anna’s power.

The much-emphasized beauty of the ice palace and the respective scientific experiments enabled a shift in the perception of severe cold, which in Russia, just as in other countries, was traditionally associated with doom and crises. I argue that the Tsarina’s ice palace was an attempt to domesticate the climate by making its most extreme feature—severe cold—into an object of artistic appropriation and scientific study, granting not only that particular winter but also the climate itself unprecedented aesthetic and scientific dimensions. The European elites were able to compete with one another not only with their grain depots, but also with the taming of the cold through art, thus demonstrating to each other the achievements of their enlightened rule.

¹² Krafft, *Wahrhaffte und Umständliche Beschreibung*, 9.

¹³ Simon Werrett interprets the references to Saturn as an attempt to gain Anna’s support for his experiments, which were connected with the ice palace. Anna was enthusiastic about astrology, and her ruling planet—as an Aquarius—was Saturn. Werrett, *An Odd Sort of Exhibition*, 174.

In his essay, Krafft emphasizes the fact that the ice palace was not an object of senseless amusement, but must be understood rather as an *experimentum physicum*, which also provided military and economic benefits. He stresses the fact that the usefulness of frozen water had not yet been fully realized, even though nobody doubted the usefulness of liquid water. Water, he asserts, has many positive characteristics in its frozen state as well. Krafft attributed life-preserving characteristics to the cold based on experiments carried out by the Academy of Sciences, although the cold in Tsarist Russia normally involved connotations of decline and death. Krafft pointed to the differing freezing points of liquids such as water, beer, and brine, and to the conserving properties of low temperatures. Furthermore, in his opinion the ice palace showed that ice was excellently suited to use as a building material.¹⁴ Krafft emphasizes time and again that these discoveries must be attributed to the Tsarina, who encouraged and supported science in the Russian Empire.

For Krafft, the winter of 1739/40 was also an opportunity to put Tsarist Russia on the European temperature maps and to establish himself as an expert on the cold among European scientists. He exchanged temperature data with such famous colleagues as the professor Anders Celsius from Uppsala and produced chronicles in which the most severe winters since 177 BCE were listed. Precautionary measures were, for Krafft, essentially feats of prediction. Based on his observations, he suspected that countries should be prepared to experience a severe cold snap once every thirty years. In his eyes, it was particularly the experiments connected with the ice spectacle that guaranteed that the domestication of the winter lasted beyond merely a single moment. The view towards larger periods of time and, thus, towards the climate as the sum product of weather occurrences robbed the winter of 1739/40 of its peculiarity and relativized its horrors. It made the present appear normal and allowed a greater degree of certainty when looking to the future. The festival, shaped considerably by art and science, propagated the message that even the forces of nature could be controlled by an enlightened ruler.

Summary

Through the fool's wedding and the ice palace, the Tsarina Anna was successful in presenting herself as a powerful and enlightened monarch who did not need to shy away

¹⁴ Krafft, *Wahrhaftige und Umständliche Beschreibung*, 9.

from comparison with other European rulers. In the reports of eyewitnesses, there are no indications that the presentation of power and authority during the festival of 1740 was unsuccessful in any way. While she used the fool's wedding to display the extent of her power, which was curbed neither by the aristocracy nor by the vastness of her empire, Anna made use of the ice palace and its connection with experiments to present herself as a supporter of the sciences, who was able to measure and tame frost.

Eventually, the spring sun spelled doom for the ice palace. The melting of the ice palace contradicted the conception of power based on ideas of durability, tradition, and timelessness. As a representative glance through the German-speaking literature shows, the ice palace lost its symbolic power as a representation of good and enlightened rule through its transience, and particularly the fact that the exact timing of its downfall could not be predicted. While it still remained connected with power and authority, the ice palace along with the fool's wedding soon came to be seen as symbols for the cruel arbitrariness of the autocracy.

In the poem *Eispalast* by Ferdinand Freiligrath from 1846, the building made of ice is portrayed as a symbol of unnatural and unjust rule, the end of which is not far away, "It [the Neval] shakes the winter frost of tyranny proudly from its neck and winds away, for long it bore the ice palace of despotism!"¹⁵ The poem is a good indication of how strongly the present situation at a given point in time alters the perception of the ice palace and its symbolic ascriptions. Freiligrath, a poet of the *Vormärz* who was writing in opposition to the *ancien régime*, connected the demise of the ice palace with the warning that sooner or later, all despotic regimes will experience their own downfall. In his poem, the transience of the ice palace and the lack of control over its disappearance become a symbol for weak rule. With the transformation of the frozen water into another physical state, namely that of a liquid as temperatures rose, Anna's power was also liquidized in the eyes of those who had seen the ice palace as a symbol of her rule. Through its inevitable transience, the ice palace became a symbol for the autocracy's lack of legitimization.

15 Ferdinand Freiligrath, "Eispalast," in *Ferdinand Freiligraths Sämtliche Werke in zehn Bänden*, ed. by Ludwig Schröder (Leipzig: Hesse, 1907), 5:99–101.

Further Reading

Freiligrath, Ferdinand. "Eispalast." In *Ferdinand Freiligraths Sämtliche Werke in zehn Bänden*, edited by Ludwig Schröder. Vol. 5. Leipzig: Hesse, 1907.

Krafft, Georg Wolfgang. *Wahrhafte und Umständliche Beschreibung und Abbildung des im Monath Januarius 1740 in St. Petersburg aufgerichteten merckwürdigen Hauses von Eiß*. Saint Petersburg: Kayserliche Academie der Wissenschaften, 1741.

Pogosjan, Jelena. "I nevozmožnoe vozmožno: Svad'ba šutov v ledjanom dome kak fakt oficial'noj kul'tury." *Trudy po russkoj i slavjanskoj filologii. Literaturovedenie* 4 (2001).

Werrett, Simon. *An Odd Sort of Exhibition: The St. Petersburg Academy of Sciences in Enlightened Russia*, Dissertation. Cambridge: University of Cambridge, 2000.

Perils: Natural Disasters and Cultures of Risk

Felix Mauch

The Perils of Water: Floods, Droughts, and Pollution as Natural Hazards and Cultural Challenges

There is no doubt about the fundamental role of water on our “blue planet.” Not only is it an essential component of natural cycles and human environments but also, ultimately, the basis for all life. In accordance with this omnipresence, water presents itself in the most varied forms and states. A constantly changing entity that—whether still or stormy, frozen or liquid, in the form of snow, rain, or vapor, in rivers, ice masses or oceans—conjures up the most varied perceptions. Water is inherently dynamic to a degree that can scarcely be emphasized enough. It manifests itself both as a fact of nature and as something that is culturally created, is both an ecological reality as well as a social good, and possesses a significant cultural, religious, economic, and political meaning.

Water, though, is not merely a force of generation and regeneration, but also a potentially dangerous substance: but only—and this is decisive—when considered in relation to humankind. For, in itself, water is not a threat. It is the relationship between water and humankind, which constantly changes according to time and place, that determines the potential of the adjective *dangerous*. Which aspects of this relationship constitute a hazard is ultimately dependent on the position of the observers and the constraints to which they are subject. Geographic, temporal, and social differences play a decisive role. Thus, the way in which a farmer from the Great Plains associates water with danger manifests itself differently than for a farmer from the Sahel zone, for inhabitants of the Philippines differently than for those of the North Sea coast. And over the course of history these perspectives, in turn, undergo a constant process of change.

Despite this abundance of interpretations, a common thread is evident: water is perceived as dangerous both where there is *too much* and where there is *too little*. In such cases, a (water) disaster is frequently not far off. Although danger is often perceived as a threat that can still be prevented, a disaster is the destructive realization of this danger.

This essay was originally written in German and has been translated for the *Perspectives* by Brenda Black. Unless otherwise noted, all translations of German sources are also the translator's.

In order to understand the impact of water cataclysms, environment and society must be examined in tandem. Such events are always culturally determined: although they have a natural origin, the effects of these catastrophes are primarily social. It is the vulnerability of human communities that decides the magnitude of a water disaster. The consequences stand in a reciprocal relationship to a community's technical and social resilience, which is distributed highly unequally. In general, it is the socially disadvantaged who lack the resources necessary to avoid this danger through preventive measures of their own or by means of social safety nets. Water then becomes both literally and figuratively a question of life *and* death. The life-giving power and the destructive violence of this element converge. Because of this ambivalent character, human societies have always given a great deal of attention to the formal qualities of water in their surroundings.

Too Much Water—Floods and High Water Catastrophes

Extreme events such as floods, storm surges, and tsunamis are excellent examples of the interrelationship between natural and social structures. They provide first-hand, tangible experience of the dangerous aspects of water for large portions of a population, frequently in a most catastrophic manner. Approximately ten thousand floods are documented each year worldwide, some of which develop enormously destructive potential. One of the most serious floods in history occurred in 1887 along the Yellow River in China: around a million people died when masses of water poured out all along the river bed over eleven cities and countless villages.

Natural triggers are generally heavy rains, storms, or snow melt. But earthquakes, too, can cause giant waves (tsunamis), which usually outstrip other types of floods in their sheer destructive force. Judging by the number of victims, the most devastating natural disaster of the twenty-first century so far occurred in December 2004, when tsunami waves of up to 30 meters high—triggered by an underwater earthquake near the coast of Sumatra—spread over the Indian Ocean. More than 230,000 people died in the countries of South Asia, the Bay of Bengal, the Andaman Sea, and along the eastern African coastline.

In the wake of disastrous floods, questions are frequently asked that relate the past to the future: Has this ever happened before? Are such events becoming more frequent? From a historical perspective, and according to the current state of scientific research, the answer in both cases must be “yes.” Despite the tendency to refer to such events as “once-in-a-hundred-years” occurrences, destructive floods are generally not isolated phenomena. Rather, they are “recurring exceptions” whose origins have a long and complex history.

Storm Surges as a Permanent Threat

In a region that is geographically at risk—such as the North Sea coast of Europe, which has been struck by storm surges again and again for centuries—the perilous forces of water and the ever-changing solutions that humans have devised to meet this challenge are particularly clear. On the North Sea coast, storm surges develop from the interplay of wind activity and astronomical tides. In this region water has long been perceived as a threat with manifold manifestations. Storm surges, such as those anchored in the collective memory of the inhabitants as a *Grote Mandrenke* in the years 1362 and 1634 or the *Great Flood* of 1962 in Hamburg, remain to this day prominent caesura and focal points of regional involvement with nature and the element water.

At the same time the perception of storm surges is not limited to the archetypal motif of the destructive and punishing violence of water, but also includes water as a medium of cleansing and renewal. This interpretation goes back to the biblical story of Noah’s Flood. Far into the modern era, natural catastrophes continued to be interpreted as acts of judgment by a divine power, called forth by human sins and hubris. The question of *why* was answered with a demand for temperance and a return to a manner of life pleasing to God. Thus, cataclysmic contingency appeared acceptable: dangerous water as a form of catharsis.

However, people have always attempted to counter the threat. In order to solve both the questions of human interaction with nature and attempt to contain nature—a dangerous force—humans have molded large portions of the coastal landscape. Thus the dike, for example, is one of the oldest forms of large-scale technology that exists and serves—not only on the North Sea—as a protective measure against and a cautionary memorial to the recurrent force of nature that is water. The dike embankments in the coastal landscape

stand visible to all as an anchoring point for remembrance of this force. Storm surges represent not only a threat, but also equally the “battle” against this danger.

Thanks to technological innovation and regulatory intervention in the environment, for a long time humans considered themselves the victors in this confrontation. The once-valid concept of adapting one’s lifestyle to nature altered over time to a concept of adapting nature to humankind’s lifestyle. Only recently has the insight begun to circulate again that total domination of nature is not possible. Complex systems such as rivers and hydrological cycles cannot be completely controlled. Water catastrophes inspire their victims to recall this fact, which we frequently choose to forget. Inundations occurring in environments that are highly developed, such as New Orleans in 2005, are emblematic of this situation.

Too Little Water—Water Shortages, Droughts, and Desertification

In the light of the great number of floods and inundations around the world, it may seem surprising that one of the greatest dangers presented by water is the lack of it. Human societies have always been concerned not only about rising but also sinking water levels. The danger of dryness is a global phenomenon as much as it is a regional one. Prolonged dry periods and droughts affect arid regions on all continents, with varying intensity. Since the beginning of the 1990s about 44 percent of all drought catastrophes have occurred on the African continent (most of them in eastern Africa), 28 percent in Asia, 17 percent in the Americas, and 6 percent in Europe. In contrast with flood-related disasters, which typically upset the social order suddenly and directly, the development of a catastrophic water shortage is more gradual. However, when drought is followed by famine the consequences for a society are no less significant. The scope of their impact magnified by political instability, the droughts and poor harvests in the Sahel region between 1968 and 1985 led to one of the most devastating humanitarian catastrophes of the twentieth century.

Once again, it is the interplay of natural and social conditions that causes water scarcity to become a fundamental problem. Prolonged lack of precipitation in arid or semi-arid zones is, as a rule, the climatic cause of a drought. Decisive in creating the dangerous potential of *too little* water remains, however, the reciprocal interaction between natural

impulses, human reactions, and social consequences. Demand and distribution of water as well as factors relating to access are key parameters.

This can be seen clearly in the example of *desertification*, a phenomenon that consists of the damage or destruction of natural resources, such as earth and vegetation, in areas with a relatively dry climate as the result of overuse by humans. Arid regions make up more than a third of the land on the planet: of these, 70 percent are subjected to processes of desertification, affecting more than 100 countries. In the countries of the sub-Saharan region, central Asia, and South America, the ecological consequences include silted-up central plateaus and land degradation as well as dried-up river beds and depleted, unproductive farmlands. As early as 1977 the United Nations recognized this form of *man-made* water catastrophe as one of the most serious worldwide environmental problems in the United Nations Convention to Combat Desertification.

Polluted Water

If the already-mentioned dangers were not enough, an immense portion of the water circulating on Earth is also considerably contaminated. Poor hygiene and the lack of sanitary facilities have caused this vital resource to mutate into an agent of disease. According to the United Nations, at the beginning of the twenty-first century more than 900 million people had only limited access to clean drinking water and 2.5 billion suffered from inadequate hygiene standards. Altogether this amounted to about half the population of the world. This situation—which primarily affects the socially disadvantaged and above all women—was recognized as a central problem in the Millennium Development Goals adopted by the United Nations. The initiative *International Decade for Action: Water for Life* (2005–2015), therefore, intends to halve the percentage of people without access to clean drinking water as an important step towards combating poverty on a global level. In March 2012, United Nations Secretary-General Ban Ki-moon stated that 89 percent of the world's population can now access safe drinking water, meaning that 783 million people are still without access. Sanitation also remains a major problem. At present 20,000 people are dying every day due to sicknesses caused by polluted water, most of them in countries in the Global South. This means more victims than those killed by tsunamis, floods, and malaria together. Water contamination is thus one of the primary causes of death worldwide.

Water as a Global and Local Problem Area

As has been shown, the challenges of water were and remain extensive. Excess water, the lack of water, and the pollution of water are socio-ecological “hot spots” and reflect the fundamental meaning of water for all areas of human life. Moreover, it is never nature alone that creates the threat; rather, it is in relation to humans that water first becomes dangerous. It is of immense importance to consider both the natural as well as the “unnatural”—that is, the social and cultural—causes of water catastrophes. The causes, reception, and consequences of floods, water shortages, and conflicts differ not only depending on their time and place but also on their specific physical and cultural environment.

The complex interrelation between water and society is not merely material; rather, it includes the symbolic constructions of “dangerous water” and the conditions of the reception of these narratives as well. Thus, the consciousness that humans are jointly responsible for natural disasters as a result of their lifestyle and their way of dealing with the environment was forgotten for a long time. Human-based interference in ecosystems such as urban sprawl, deforestation, and infrastructure projects has only recently begun to be interpreted critically (although not by all). And even then there are significant differences. While the general public is indeed aware of the threat of high water and floods, recognition of the dangers of water pollution and water shortage still remains in the shadows.

The Future of the Dangers of Water

Environmental scientists and critics of the status quo predict that humankind will experience problems with water first and foremost in their expansive usage of natural resources, and that they will run into unyielding limits in the near future. Water shortages are already causing waves of migration and battles over distribution, which could escalate to grave political, social, and economic conflicts. The danger of serious floods is increasing due to climate change. Extreme precipitation, but also droughts, have increased dramatically in frequency and intensity over the last 40 years. At the same time, the damage caused by each catastrophe is also rising. In the course of worldwide

urbanization, large agglomerations with high population densities face particularly large challenges. Water pollution proves to be a central problem here as well.

Admittedly, human attempts to control water are as old as the fear of water. At the same time, the amount of floods, droughts, and river degradation demonstrates that these attempts have not always been successful and that—particularly in the course of global climate change—solutions of the past are likely to be less suitable in the future. *Secondary disasters*, in which the disaster management systems and the technological infrastructure themselves become a new danger, are no longer unusual. Here the belief that it is possible to develop a reliable safety measure is just as deceptive as the hope that water crises and disasters are merely an exception to the norm.

On the contrary, danger is a constant, essentially inherent component of the human-water relationship. It chiefly remains hidden in the subconscious of the general population until it rises to the surface once again, in catastrophic proportions. In recent decades this has happened, not necessarily more often, but at least more severely. Societies will need to recognize the dangerous realities of water in the face of the changes happening globally and locally and redefine their relationship to this fluid element accordingly. Otherwise, not only will the words “water” and “danger” continue to be mentioned in the same breath, but, increasingly, “water” and “catastrophe” as well.

Further Reading

- Bankoff, Greg. *Cultures of Disaster: Society and Natural Hazard in the Philippines*. London: RoutledgeCurzon, 2003.
- Behnke, Roy H. *Desertification: Causes, Impacts, and Consequences*. Berlin: Springer, 2011.
- Böhme, Gernot and Hartmut Böhme. *Feuer, Wasser, Erde, Luft: Eine Kulturgeschichte der Elemente*. Munich: C. H. Beck, 2010.
- Devine, Maureen and Christa Grewe-Volpp, eds. *Words on Water: Literary and Cultural Representations*. Trier: WVT Wissenschaftlicher Verlag, 2008.
- Eswaran, Hari, Paul Reich, and Taweesak Vearasilp. "Perspectives on Desertification during the Anthropocene." In *Land Degradation and Rehabilitation: Dryland Ecosystems*, Edited by Angel Faz Cano, Ahmet R. Mermut, Joselito M. Arocena, and Roque Ortiz Silla, 1–16. Reiskirchen: Catena Verlag, 2010.
- Hukka, Jarmo J., José E. Castro, and Pekka E. Pietilä. "Water, Policy, and Governance." *Environment and History* 16 (2010): 235–251.
- Kempe, Michael. "'Mind the Next Flood!' Memories of Natural Disasters in Northern Germany from the Sixteenth Century to the Present." *The Medieval History Journal* 10, no. 1 (2007): 327–354.
- Van Dam, Petra J. E. M. "Water, Steam, Ice: Environmental Perspectives on Historical Transitions of Water in Northwestern Europe." In *Elements—Continents: Approaches to Determinants of Environmental History and their Reifications*, edited by Bernd Herrmann and Christine Dahlke, 29–43. Stuttgart: Wissenschaftliche Verlagsgesellschaft, 2009.

Agnes Kneitz

Polluted Water

And so we walked around the man-made slough, which covered a good twenty acres, and succeeded in reaching, beneath the wall of the great factory, the dark stream of hot, dirty-yellow liquid that first set the brook steaming and then spread together with it over the broad expanse which my near ancestors had known only as a meadow.¹

Experiences such as this—coming across a stinking stretch of water during a walk, rather than a clear little brook—were not unusual in the industrialized regions of the German Empire in the second half of the nineteenth century. But, it was unusual to read about them in *belles lettres*. Wilhelm Raabe's book *Pfister's Mill: Notes from a Summer Vacation* is one of a very few works of German literature in which the polluted state of the national waters is not only mentioned, but described to its full extent. Just to what extent this early critique of progress went against the *Zeitgeist* of the early 1880s is shown by the general repudiation of Raabe's book, first by publishers and then by readers. For these sometimes nauseating descriptions were, of course, not read gladly—and certainly not for pleasure. Even if—according to the evidence of Raabe's contemporaries—it clearly portrayed reality at the time.

Until the end of the nineteenth century—before intensive scientific testing and the slow emergence of a deeper understanding of nature and environmental protection—polluted water was perceived as a matter of course in a further developing world, an inevitable part of progress. Polluted water—which due to industrialization gradually came to characterize all water—was seen almost as a sacrificial offering: a normal development that nobody could or would correct; a price worth paying for general wealth and prosperity. When did perceptions of polluted water change, when was it no longer considered a part of everyday life? And what caused the tide to turn?

This essay was originally written in German and has been translated for the *Perspectives* by Kirsty McCluskey. Unless otherwise noted, all translations of German sources are also the translator's.

1 Wilhelm Raabe, *Pfisters Mühle: Ein Sommerferienheft* (Leipzig: Grunow, 1884), 151.

A Matter of Course

For a long time polluted waters remained only of interest to science. In the nineteenth century, a significant reorientation in the natural sciences was unfolding; the diverse subject areas were expanded and new methods and tools were developed. It was precisely in the analysis of water samples—for example, in the context of a legal dispute about polluted bodies of water—that a new dimension was discovered that would revise and improve process technology accordingly. In particular, biological research, which was still in its infancy in the second half of the century, gained an additional field of practical application in this way.

The concept of the *Opferstrecke*—“sacrificial stretch”—is an important metaphor in this discourse: This is how, from 1902 onwards, the chemist Curt Weigelt labeled the section of a river, that was of such economic significance that the interests of fishery—and along with that, the life in the water—had to be *sacrificed*.² This concept, conceived as a bridge between colliding interests, was a disastrous one, which did not reduce the willingness of Germans to pollute their environment.

This is not to say that pollution was a new concept. Polluted water had been a part of everyday human life. It was seen as normal, although—even before the heyday of industrialization—it could take extreme forms, especially in highly populated areas: in the Middle Ages, for example, the Seine within the Paris city limits was so contaminated that King Charles VI considered it almost a miracle, in 1404, that the people who used the river water did not die as a result. A similar complaint arose in Stuttgart in 1640; not only did the Nesenbach stink, but it was so congested that Duke Eberhard III forbade “anything” to be dumped into the city waters.

In these examples, however, only the direct effects on humans were considered relevant to the discussion, although environmental damage could be seen with the naked eye. For a long time, no great significance was accorded to the effect of polluted air or water on the environment. Moreover, the potential health consequences of polluted water were long underestimated. In his study of the effect of sewage and wastewater on the water quality of the Spree in Berlin in 1841, the medical doctor Albertus Magnus

2 Protokoll der 25. Hauptversammlung des Vereins zur Wahrung der Interessen der chemischen Industrie in Deutschland zu Frankfurt 1902, Mwi 6983, Hauptstaatsarchiv München, 15.

cited a mariner who, immediately after someone had emptied a chamber pot into the river, took cooking water from the same spot: “Doesn’t matter, it makes you fat!”³

In general, there was no law against pollution before the end of the nineteenth century, and where legislation existed, it dealt only with exceptional cases such as in early modern Stuttgart. For the most part, countermeasures were introduced only as a result of an extreme situation or the immediate threat of one. One example of this was the city of Braunschweig: In 1880, the area around this old ducal seat had the highest density of sugar refineries in the German Empire. Water pollution rich in organic matter resulting from their effluence could no longer be imagined away. There were indeed legal disputes, in which scientists were also consulted and which had broad repercussions, about the effects of this effluence. However, only when Braunschweig’s water supply system broke down completely in the winter of 1890/91, and the river water (on which the town depended) could no longer be used as drinking water or for washing, were wastewater treatment regulations finally introduced, and then only for certain industrial plants. Although this improved conditions somewhat, according to the results of a biochemical study, the putrid taste of the drinking water remained. The author Wilhelm Raabe wrote about this same event to his daughter on 17 January 1891: “Be glad that you are not in Braunschweig anymore. A complete pigsty! We don’t wash anymore, we don’t clean our teeth; you can taste the water of the Oker, besmirched by the twelve sugar factories. Pfister’s Mill in its most fearsome incarnation!”⁴ Once more, Raabe drove home the connection between polluted water and technological progress.

In the end, polluted water, like clean water, is a natural part of human life. In the process of being used, clean water is turned into wastewater. There is a certain powerlessness in this causal relationship—a sense of the inevitability of pollution.

Delayed Detection

The simultaneous assumption of the incessancy of clean water and the misconception of the inevitability of polluted water in an industrialized world resulted in the delayed

3 Albert Magnus, *Ueber das Flusswasser und die Cloaquen grösserer Städte: In medicinisch-polizeilicher Hinsicht* (Berlin 1841), 22.

4 Cited according to Horst Denkler, *Neues über Wilhelm Raabe: Zehn Annäherungsversuche an einen verkannten Schriftsteller* (Tübingen: Niemeyer, 1988), 101.

detection of water pollution's negative consequences. One reason why researchers only came relatively late to the problem of water pollution was the simple observation that polluted bodies of water, especially rivers, appeared to clean themselves. If a stretch of river within a settled area was polluted (even heavily, as was often the case), a substantial improvement—possibly even a complete absence of pollution—could be observed a few kilometers upstream. Even though the processes of biological transformation and chemical sedimentation, taking place alongside the dilution process, could not be seen with the naked eye, this still seemed enough of a basis to assume that the problem would solve itself. This theory was also extensively backed by the natural sciences, above all the concept of “natural self-cleansing”—first coined by Max von Pettenkofer—which legitimized an ever-increasing level of toxic emissions in flowing waters.

Progressively, under the increased scrutiny of the natural sciences, the self-cleaning model had no chance when faced with the breadth and depth of pollution. The general feeling of helplessness about water pollution slowly reached another level: despite heightened awareness, water pollution could not be hindered. On one hand, the technology was lacking; and on the other, due to insufficient legal grounds, most conflicts of interest continued to work against the “defenseless” water. Curt Weigelt had tried to navigate this impasse through his concept of the sacrificial stretch, but this had the opposite effect. The additional evidence of the chemical self-cleaning of water only led to a yet more careless attitude towards organic and inorganic effluence, until at the turn of the century a number of filtering techniques were discovered and developed.

“The main task of rivers is above all certain: to take all water which is superfluous or already used, and thus impure, away to the great reservoir of the sea,” a contemporary chemist wrote.⁵ For what was previously accorded to agriculture, should be accorded in the same measure to industry—society's new driving force. From now on, the parameters of further debate were defined by a technical understanding of a river's ecosystem, with which the (chemical) industry—as part of culture—could be seamlessly integrated. Nature and culture (technology) had already become to some degree dissociated.

5 Ferdinand Fischer, “Der Einfluss der Industrie auf das Flusswasser,” *Zeitschrift für angewandte Chemie* 13 (1899): 83.

The self-cleaning capacity of water was inferior to the extreme extent and depth of pollution; here, science intervened. However, through the scientific study of dirty water, the question was elevated to a more abstract level, which in turn led to an ever more marked dissociation of humankind and nature. In the controversy about connections between nature and culture (technology), the previously close relationship between humankind and water could be reduced to the dichotomies of “clean water and nature” versus “polluted water and culture (technology).”

Humankind has distanced itself ever further from nature. However, once a certain distance was reached, this actually led to a reversal: from this external perspective, humans became even more aware of nature. With a new worldview, and “environment” as a rallying cry, the motives for monitoring and treating dirty water have finally changed. Indeed, since the ecological near-collapse of many “traditional” industrialized nations, far-reaching emissions laws have often come into existence, which have contributed to a substantial improvement of conditions. Polluted water has been reduced to a “nature-compatible” minimum level, and the self-cleaning capacity of bodies of water can now become effective once more—even if its superiority is no longer that of two hundred years ago—as humankind now intervenes to regulate and support nature.

However, dirty water still poses a considerable problem on a global scale; particularly in those places where the people “cannot” yet be led by noble motives such as the romance of environmental protection. In many parts of the world, industrialization is only now entering its heyday; in others, this phase still (perhaps) lies ahead. The same problems with which Europe had to contend a century or two before are now becoming urgent elsewhere. What to some is merely dirty water, to others is survival. In contrast to the nineteenth century, however, these problems are now regarded from a different (external) perspective. We have the example of history to follow, and we see that polluted water can exist in different forms and on different gradual scales. From the examples that informed our technological progress we should also learn to avoid certain mistakes, both in general and within certain limits. At least, this is the theory.

Just as water is a normal and natural part of human life, so polluted water remains; it is a natural element of the world because of the interconnected relationship between humankind and water. Our helplessness also remains. Clean water is a basic requirement for survival; dirty water is an inevitable consequence of human life.

Today, critics are writers, as they were yesterday. They continue to remind us of our responsibility to find a balance between progress and environmental compatibility. We can only hope that in the future the unseemly pictures, such as those depicted by Wilhelm Raabe, will truly remain in the past:

It was an autumn-winter smell, which neither the city nor the country guests, nor the journeymen, nor the gearwheels or my poor, happy father were able to bear. Nor could the fish . . . As these said nothing, but simply floated mutely about on the surface of the river, singly or in groups, their silver-scaled bellies turned upwards, so were people here, too, dependent on their own observation.⁶

Further Reading

Denkler, Horst, ed. *Neues über Wilhelm Raabe: Zehn Annäherungsversuche an einen verkannten Schriftsteller*. Untersuchungen zur deutschen Literaturgeschichte, 46. Tübingen: Niemeyer, 1988.

Ferdinand Fischer. "Der Einfluss der Industrie auf das Flusswasser." *Zeitschrift für angewandte Chemie* 13 (1899): 80–86.

Protokoll der 25. Hauptversammlung des Vereins zur Wahrung der Interessen der chemischen Industrie in Deutschland zu Frankfurt 1902. MWi 6983. Hauptstaatsarchiv München.

Magnus, Albert. *Ueber das Flusswasser und die Cloaquen grösserer Städte in medicinisch-polizeilicher Hinsicht*. Berlin: Hirschwald, 1841.

Raabe, Wilhelm. *Pfisters Mühle: Ein Sommerferienheft*. Grenzbotensammlung. Erste Reihe, Band 22. Leipzig: Grunow, 1884.

6 Raabe, *Pfisters Mühle*, 75f.

Wolfram Mauser

Sustainable Water

Most articles about water start with a statement that outlines the tremendous meaning of water for life on this planet; they start with sentences like “there would be no life on Earth without water.” Can we think of anything more rudimentary? Very few people, and especially nobody from water-scarce regions of the globe, challenge these statements. An interested reader, reading further, is impressed by the manifold ideas on water, which develop with more or less pain and vigor from such a mighty but almost trivial introduction. Some tell us about religion and myths, trying to explain our own feelings of dependence and vulnerability towards water and the fact that we can only live without it for a few days. Some tell fanatic or fantastic stories about tamed rivers, artificial lakes, pipelines, and hydraulic heads and flows. They try to convince us that culture depends on the right kind of water at the right time. And, of course, some are stories about those who can magically conjure water to be there right when it’s needed most. Some tell us that cultures vanished because they ran out of water. They analyze how it was and is wasted and contaminated, how it was and is the origin of most diseases and the source of many conflicts, and how it was and is badly governed. They tell us stories of greening deserts, of endless food instead of the usual starvation, of fertile fields and open landscapes instead of muggy and impenetrably dense forests. Why don’t we find a similarly manifold palette of stories on crude oil, on the sun, or on nature itself? What do all these stories and myths tell us about water, and what do they tell us about ourselves?

Some facts: No doubt, water is systemic for Earth. Systemic in a much more basic sense than any bank is to the global financial system; it makes Earth different from all known planets and is responsible for its comfortable and hospitable living conditions. Together with its close relative, carbon dioxide, it established a greenhouse thermostat that captures solar heat, raises Earth’s temperature by 35 degrees Celsius, and keeps it there. Without this thermostat, Earth would basically be a frozen snowball in the universe. This temperature increase made liquid water, lakes, rivers, and oceans possible, and in the course of evolution formed carbon-based life. It took generations of scientists to understand that water on Earth is not produced or destroyed, but rather follows a cycle of evaporation, moisture transport, rainfall, and runoff. It is this constant global distillation and distribution process that simultaneously purifies water while cycling;

water evaporates, leaving all substances behind in the oceans—their salt content has increased to 3.7 percent during the last 3 billion years—and starts the next round with fresh water in the form of rain. It is not hard to imagine what water on Earth would look like after 3 billion years of cycling without this natural purification: Billions of years worth of waste would have accumulated and water would be saturated with all the soluble materials on Earth. Therefore, everything could be found in water in large quantities, because everything can be dissolved in water.

The perception of distillation and transport as a permanent reset of the quality of rainfall was the blueprint for our understanding of renewable natural resources. A renewable natural resource not only follows a cycle that sends the resource around the globe until it returns to the origin of its travel. A renewable natural resource follows a cycle that also systemically returns the resource to its original state. This is not trivial, and we have very few other cycles on Earth that can also serve as an example for such a robust yet simple loop, which could, at least in principle, go on forever. This idea of a cycle has formed the foundation for a deeper understanding of ecosystems and their functioning. Similar cycles were discovered—such as the carbon cycle, in which plants constantly build extremely complicated, even self-reproducing, carbon-based molecules essentially from carbon dioxide and water in order to finally convert them back into carbon dioxide and water with the help of powerful micro-organisms. At first glance this may sound like a zero-sum game. Nevertheless, over the ages these two cycles have managed to totally change the shape of the planet; they have eroded and removed tall mountains, accumulated huge flood plains, put oxygen in, and removed most carbon dioxide from the atmosphere, storing it in mountains of limestone. The co-evolution of life and its inanimate environment over the past 3 billion years has eventually managed to create an increasingly hospitable environment for life on Earth and, by constantly renewing itself, maintains a balanced state that is far from the original inanimate equilibrium, which existed at the beginning of this process.

Even though the basic principles of distillation, transportation, composition, and destruction within the fundamental cycles on Earth seem simple at first, up close they reveal an intricacy that allows for the complex and unique interaction of all living and non-living elements of the Earth's ecosystem independent of their location on the globe. Equipped with a lifespan of approximately 70 years, we wonder whether the fact that these cycles have uninterruptedly been in place now for at least 3 billion years expresses

their fundamental robustness: Are they, and the life they produced, a basic property of Earth such as gravity? Almost everybody would agree that gravity cannot be switched off, because it is a fundamental property of matter. In this case, if the water cycle can also be considered a basic property of Earth, nothing could switch it off either. Or does the water cycle express the resilience of a uniquely coupled bio-physical system, which, through evolutionary adaptation and within boundaries, buffers changes in the natural environment and thereby keeps it suitable to carry life? These are undoubtedly fundamental and important scientific questions at the center of today's debate on sustainable development! Can the water cycle, and thereby life, be stopped through human interference or will the Earth system buffer it away as it has buffered all external disturbances in the history of the planet and kept life alive on Earth? The academic answer may most likely be, "Yes, it can be buffered but at the expense of humankind." Since this answer is irrelevant from a human perspective, the relevant question is: "can human interference with the global water and carbon cycle be buffered without humankind disappearing?" This is the systemic question that goes beyond the myths and stories told about water.

At this point, a closer look at how humans use water is worthwhile. More than 60 percent of the rainfall that falls on the global land surface, is already used by humankind mainly to produce food and biofuel. Water is transpired into the atmosphere in large quantities by growing vegetation. One may argue: "how can water be used when it is only entering the plants through the roots and leaving them through the leaves?" Using the term "water use" in this context expresses a decision in favor of one pathway along the water cycle instead of another. Without vegetation most of the water would have most likely ended up in rivers, with vegetation it ends up in the atmosphere. But how do we, by growing food, influence the water cycle differently than the natural vegetation that has grown since before humankind? We substitute natural vegetation with our favorite breed of plant species with the intention to use as much rainfall or irrigation water as possible to produce as much food as possible with the help of fertilizers and pesticides. We thereby change the rules of nature, following our own interests and altering the environment in favor of our preferred plants. Agriculture is not a tiny backyard experiment; it is the largest human undertaking on Earth, actively involving 3.5 billion people, or half the global population, from different cultures, interests, technologies, and with different goals.

Natural ecosystems are familiar with starvation. They have throughout the course of evolution been short of nutrients and, therefore, rely on efficient recycling strategies that

minimize erosion and land degradation. With the invention and application of fertilizers, man-made agricultural ecosystems forgot how to starve and now produce and release waste, which erodes and degrades land. Stimulated by fertilizer, they drive agricultural water use to its limit and beyond at the expense of river water. This can be observed in the case of the Colorado River, the Yellow River, and many other rivers, which at times have almost completely evaporated and not been able to reach the sea. Does it make a difference whether river water is used for the benefit of food production and evaporates on land instead of in the ocean, where it was originally headed? Yes it does! Eventually the water that evaporates leaves all constituents behind. It makes a difference whether this happens in the ocean or on farmland. The ocean will dissolve all salts, fertilizers, pesticides, and human waste. The soils on the farmland will keep these constituents and, if badly managed, will lose fertility. The land will eventually be unsuitable for food production or, in the worst case, maybe even for sustaining vegetation. Today, the amount of irrigated land on the globe that is lost each year through soil salinization and degradation is almost as large as the irrigated land that is newly established. Clearly, this process is not sustainable.

Without land resources, water resources cannot materialize, because only land can turn rainfall into food or biofuel. The current land rush in all parts of the world is a clear signal that the geopolitical and financial keyplayers, in their urge to turn as much rainfall as possible into tradable commodities, see the access to water utilization, rather than the access to water, as the critical strategic resource of the future. Will this trend eventually destroy the water cycle? No clear answer can be given yet, but at least it cannot be precluded. What seems to be clear is that the land rush increasingly affects the global water cycle either by agricultural expansion and the removal of protected areas, or by agricultural intensification and pollution and erosion of existing arable land. Some accompanying effects are quite clear: Land rush surely will intensify water and land use. It will boost agricultural production, which is necessary to expand western style consumption patterns, feed the increasing global population and satisfy the investors. It will make millions if not billions of people landless. There is a good chance that it will wash away any suitable and productive protected areas on the globe, and leave the wilderness reserved to places not suitable to turn rainfall into commodities. However, productive protected areas are vital for the long term stability of Earth's life-support system to preserve biodiversity as a pool of opportunities to adapt to currently unforeseen future developments. We are currently witnessing the onset of the second global wave of "land

grabbing” after the expansion of the colonial powers in the nineteenth century. As in the past, this wave seems to be largely uncoordinated and will most likely not follow any ethical and environmental standards.

Unlike in the past, this current wave takes place within the framework of a globalizing food and bio-fuel market. Deteriorating land resources is the price for cheap food, animal feed, and biofuel, which are produced in developing regions below minimum environmental and social standards and then injected into a growing globalized trade system to maximize profits in regions of high income. Without trade regulations, which take into account minimum environmental and social production standards, this is the inevitable logic of the globalized trade.

Unlike in the past, this also takes place on a transparent globe. Today we have at our disposal detailed up-to-date information on each corner of the globe and even the smallest and most remote piece of land. An active internet and a growing fleet of satellites, transmitting a continuous stream of images on the state of the land surface and the water resources, irrespective of national boundaries or political restrictions, mirror how we transform the globe. Knowledge creates responsibility.

On a transparent globe, ignorance is no excuse anymore.

Further Reading

Mausser, Wolfram. *Water Resources: Efficient, Sustainable and Equitable Use*, translated by Karen Schneider. The Sustainability Project Series. London: Haus Publishing, 2008.

RCC Perspectives

RCC Perspectives is an interdisciplinary series of papers and essays in environmental history, environmental studies, and related fields. The papers have their roots in the scholarly activities of the Rachel Carson Center for Environment and Society and in current debates in society. They combine thought pieces and fresh empirical research, and they are designed both to further international dialogue and to inspire new perspectives on the complex relationship between nature and culture.

perspectives@carsoncenter.lmu.de

Series editors:

Christof Mauch
Katie Ritson
Helmuth Trischler

Editors:

Dominic Kotas
Katie Ritson
Rachel Shindelar

All issues of *RCC Perspectives* are available online. To view past issues, and to learn more about the Rachel Carson Center for Environment and Society, please visit www.rachelcarsoncenter.de.

Rachel Carson Center for Environment and Society
LMU Munich
Leopoldstrasse 11a
80802 Munich
GERMANY

Design by Stefan Zinsbacher

Cover photo: Three Gorges Dam, Sandouping, Hubei Province, China, 26 Juli 2004.

Photograph courtesy of Nowozin. GFDL.

Printed on recycled ENVIROTOP paper by PAPER UNION GmbH

© Copyright is held by the contributing authors.

ISSN 2190-5088

Munich, 2012

ClimatePartner^o
printed climate-neutrally



LUDWIG-
MAXIMILIANS-
UNIVERSITÄT
MÜNCHEN

Deutsches Museum



ISSN 2190-5088