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Alex Prud'Homme, The Ripple Effect: The Fate of Freshwater in the Twenty-First Century

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In the city of Perth, water manager Jim Gill started planning for drought after looking at inflow data for the city's dams and concluding that the only trend was less and less water. Gill decided building more dams was not going to solve the city's water problems if there was no rainfall, so he started looking for other sources of water. With good technology and better political maneuvering, Gill managed the construction of Australia's first city-scale, drinking water desalination plant. But even with a desalination plant, the real struggle is changing the human habits that assume abundant water.

In Chapter Eight, *Where Water is Worshipped, but Gets No Respect*, Fishman presents India as an example of a broken water system. Major cities in India do not provide 24/7 water to any customers; in this way, when it comes to water, the poor and the wealthy in India have a lot in common. The difference is the poor gather their water in five gallon buckets, while the wealthy use pumps to fill large storage tanks in their homes. The water is available, but the neglected infrastructure cannot deliver it reliably or safely. In rural India, women and girls can spend hours walking to get water from wells; this prevents them from working or going to school.

In Chapter Nine, *It's Water, Of Course It's Free*, Fishman explores the pricing of water. The monthly water bill is not a charge for water, but for the infrastructure to deliver that water. Without transparent pricing, water use is inefficient. However, pricing water equally becomes a problem when society does not want to price anyone out of access to safe water. Fishman introduces different ways of approaching water economics while still providing the first glass.

In Chapter Ten, *The Fate of Water*, Fishman reiterates the need for transparency in the human relationship with water. People need to start thinking about water and thinking about their attitude towards water.

In conclusion, this book is an enjoyable read directed towards a non-technical or non-legal audience. Fishman provides illustrative and memorable examples of the relationship between people and water.

Jessica Bidgood

Alex Prud'Homme, The Ripple Effect: The Fate of Freshwater in the Twenty-First Century, Scribner, New York (2011); 405 pp; $27.00; ISBN 978-1-4165-3545-4; hardcover.

To most people, water is boring. It comes cheaply and easily from our taps and showerheads, fills our swimming pools and oceans, and flows through our rivers. Though most people interact extensively with water on a daily basis, we rarely stop think about our impact on what is essentially a static resource.

In a world of ever-increasing population and pollution, fresh water is becoming more and more scarce and the consequences of shortage are severe. In *The Ripple Effect*, Alex Prud'Homme provides a bird's-eye

view of both water issues and innovations. Separating his discussion into four sections, Prud'Homme first explores the issue of water quality. In the second and third sections, he confronts the consequences of drought and flood on water supplies and quality. And finally, Prud'Homme examines current innovations that could harm or alleviate fresh water shortages.

Prud'Homme quickly grabs your attention, presenting a gripping murder mystery that leads into the far-reaching effects of a dead body in a source of drinking water. This provides the reader with an interesting example of how one relatively small source of contamination could potentially poison the source of drinking water for millions of people. Prud'Homme then creates a complex map of related issues of water quality, identifying large point sources of pollution and incorporating a discussion of the BP oil spill in the Gulf of Mexico, the contamination of Chesapeake Bay, and the Pittsfield General Electric Plant. In each of these cases Prud'Homme tells the story from the point of view of an eyewitness.

Perhaps the most interesting story in section one is the story of Sister Francis Gerard Kress. A local nun, she became worried about the health of her neighbors when she noticed the existence of "black mayonnaise" in her Brooklyn neighborhood in the summer of 1978. This "black mayonnaise" was a viscous layer of industrial chemicals that coated the surface of Newton Creek. When outside help was not readily available, she donned a hazardous materials suit, climbed fences into vacant lots, and dodged packs of wild dogs, all in an attempt to examine the creek. Eventually, the Church caved to external pressure and banished her to another parish. It was not until 2009, when local interest groups sued the oil companies that were the source of the "black mayonnaise," that any real progress was made. Newton Creek is still largely lifeless because the $104.7 million jury award is grossly insufficient to ameliorate the effects of decades of severe pollution.

In the second section of the book, Prud'Homme discusses the effect and likelihood of drought in the United States. In what seems like a counterintuitive approach, he begins the section by discussing the quality of plumbing in Manhattan and upgrades that are currently underway. While interesting, the example leaves the reader a bit puzzled as to what this example has to do with drought. The answer comes a few chapters later when Prud'Homme explains that the United States' drinking water system is one of the most outdated and inefficient in the world. Its drinking water systems, wastewater treatment plants, inland waterways, and levees have all been declared "dangerously compromised" by the American Society for Engineers. This means not only that the United States uses water extremely inefficiently, but also that water officials have only rough estimates of actual water use due to such inefficiency. Thus, in the event of a severe drought, water officials will have incomplete preliminary data with which to implement austerity measures.

Next, Prud'Homme examines the existing drought in the American Southwest and the resulting effects on its growing cities. Providing an

excellent synopsis of the conflicts surrounding California's Owens River Valley, he illustrates the rise of water transfers to booming cities like Los Angeles and San Diego. Las Vegas, he bluntly explains, is a city that should not exist. In the early days of the city, there existed a large enough aquifer beneath it to sustain a small population. As the city grew, the aquifer dried up and Las Vegas is now almost entirely dependent on Lake Mead for its water. But what makes Las Vegas the "city that should not exist" is its opulence and excess juxtaposed with its tenuous supply of drinking water. For example, the Sultan of Brunei's property in Las Vegas uses 17 million gallons of water per year. Furthermore, this opulence is not the exclusive practice of the Las Vegas elite. Las Vegans use an average of 254 gallons of water per capita per day compared with San Diegans (residents of another city known for its golf courses and swimming pools), who use only 150 gallons of water per capita per day. Perhaps most damning for the future of Las Vegas is the fact that its water officials have chosen to find more water to import from further away, rather than implement strict conservation measures and raise water rates. Therefore, Las Vegas could face serious trouble in the case of a severe drought.

In the third section, the book centers on the effects of flood on the inefficient water infrastructure of the United States. Focusing mainly on the Southeastern United States, Prud'Homme examines the "comedy of errors" that led the Army Corps of Engineers, local politicians, and an inefficient legal system to create a levy system that is dangerously underfunded and incapable of handling a major natural event. He highlights how the use of the hundred-year levee has proven insufficient without proper maintenance. The prominent example he uses is the devastating effect that the failure of the levees had on New Orleans during Hurricane Katrina. He then contrasts the use of the hundred-year levee with the ten-thousand-year flood protection in place in the Netherlands.

As a naturally low-lying country, the Netherlands has been building levees for centuries. Today roughly two-thirds of Holland's population lives almost twenty feet below sea level. In order to protect its population, its government has funded the most comprehensive and technologically advanced flood control system in the world. Considering this system cost $7.5 billion, one would think that the Dutch would be content with their defenses. Yet the Netherlands was willing to commit another $1.5 billion to upgrade its flood control system to combat global warming. Prud'Homme explains that not only is the Dutch system more technologically and scientifically advanced than that of the United States, but it is also significantly better-funded. Funding, he argues, is the crucial factor in determining the effectiveness of a flood control system.

The final section of the book focuses on the future of water quality issues. As the world population grows—having now surpassed the seven billion mark—it is going to exert more and more pressure on a finite amount of water. Many countries are looking to address future water issues through a combination of conservation and technological innovation. Prud'Homme notes that conservation is tied to the cost of water;

therefore as population grows, water will likely become more expensive and prompt further conservation measures. "Water prospecting" has emerged as a new field and attracted many former oil and gas prospectors, including famous Texan T. Bonne Pickens.

Pickens believes that as fresh water becomes scarcer it will move from being a common good, like air, to a commodity, like oil. As a common good, water is already a $500 billion-a-year industry in the United States. If markets start treating water as commodity, the profit potential increases almost exponentially. Proponents of the commodity approach claim that there will be less waste if water is privatized, and that technological innovation is more likely to be effective in a privatized model. Proponents of the "common good" approach instead argue that water is essential to life, like food or air, and should not be privatized because doing so would only widen the gap between rich and poor. Ultimately, the focus of water administrators would shift from supplying as many people as possible with clean drinking water to making a profit and pleasing shareholders.

Examining water privatization in developing countries, Prud'Homme finds that privatizing water often leads to innovation but also prompts price increases, social and political discontent, and sometimes violence. He then proposes a hybrid system wherein a certain amount of water is allocated to a person per day. In this system, any additional water would be treated as a commodity that could be bought and sold.

Technological advancements are often difficult to predict in advance, but many engineers argue that technology could make significant strides to alleviate a future water quality crisis. For example, Prud'Homme explains that desalinization efforts underway in arid regions around the world have met some degree of success. And as desalination technology advances, it will likely become less expensive, more efficient, and less environmentally damaging. Another option Prud'Homme discusses is cloud seeding, which involves efforts to change the precipitation from clouds. While there is little or no scientific evidence that cloud seeding actually works, places like Colorado, Wyoming, and even China are willing to pay millions to develop and test this technology.

The Ripple Effect provides a gripping and comprehensive view of freshwater issues around the world. Prud'Homme explains complicated water problems in a way that is both informative and exciting. *The Ripple Effect* is an excellent book for any person, especially one new to water issues, who desires a comprehensive view of freshwater in the United States.

Johna Varty