REVIEWS

Out of Sight, Out of Mind

AN ONCOMING CRISIS OVER MISUSE OF A HIDDEN RESOURCE-AMERICA'S AQUIFERS BY DOUGLAS JEHL



WATER FOLLIES: GROUNDWATER PUMPING AND THE FATE OF AMERICA'S FRESH WATERS by Robert Glennon Island Press, Washington, D.C., 2002 [\$25]

In the high plains of Texas the farmers who grow cotton, alfalfa and other crops are entitled by law to as much underground water as they can reasonably use. No matter that this water comes from the Ogallala Aquifer, that vast underground reservoir whose levels have dropped precipitously since 1940. No matter that the overpumping threatens eventually to put thousands of farmers across seven states out of business. The illusion, codified in the law not just in Texas but in much of the U.S., is that groundwater is somehow boundless, or in a category apart from lakes, rivers and streams, and ought not be regulated, even for the common good.

Now comes Robert Glennon to puncture this illusion, in a book as rich in detail as it is devastating in its argument. Its focus on groundwater brings overdue attention to a category that accounts for nearly a quarter of American freshwater use. Its title, *Water Follies*, sets the tone for tales that can be tragicomic; this is a book about water being squandered, so it is also, as the author puts it, a book about "human foibles, including greed, stubbornness, and especially, the unlimited human capacity to ignore reality." Take, for example, his story of the fast-food french fry. It used to be that potatoes were grown on unirrigated land, he writes, but Americans' love of processed foods changed that. Uneven moisture leads to small, knobby, misshapen potatoes, so most American growers, even in places such as Minnesota, routinely irrigate their lands, to produce products acceptable to the industry and customers like McDonald's.

But in Minnesota the groundwater that farmers pump for potatoes turned out to be the same water that helps to sustain the Straight River, a major trout fishery. Even modest pumping for potatoes, a federal study eventually concluded, had the potential to reduce the river's flow by one third during irrigation season, with ad-

verse impact on the brown trout. For now, the trout are not in danger, but that could change if Minnesota were to approve applications from farmers still eager to see potato planting and irrigation widen.

"One long-term answer, of course," Glennon notes, with characteristic wryness, "is for us, as American consumers, to accept french fries that have slightly different colors, or minor discolorations, or even ones that are not long enough to stick out from a supersize carton."

Farmers are not the

only ones who get a hard time for their shortsightedness. Bottled-water purveyors, particularly Perrier, are tarred for their pursuit, in places such as Wisconsin, of cool, underground (and highly profitable) springwater in quantities so vast as to prove devastating to the ecology of nearby rivers. The gold-mining industry is called to account for "dewatering" operations in, for example, Nevada, where it makes way for its deep operations by pumping away groundwater at a stunning rate. And planners in Tampa, Fla., and San Antonio, Tex., come under fire for their cavalier reliance on perishable underground sources such as Texas's Edwards Aquifer to fuel development they are finding difficult to sustain.

The cumulative picture painted by the



SINKHOLE, 60 feet deep and 50 feet wide, created by groundwater pumping in Orlando, Fla., June 2002.

author is a grim one. Already four states— Florida, Nebraska, Kansas and Mississippi—use more groundwater than surface water, and more and more are looking underground to support growing populations. Becoming equally apparent are the consequences in dry rivers, land subsidence, and aquifers drawn down far faster than they can ever be recharged. "The country cannot sustain even the current levels of groundwater use," Glennon writes, "never mind the projected increases in groundwater consumption over the next two decades."

Why is it that groundwater has become subject to such abuse? One reason, of course, is that buried below the surface, it is hidden from the kind of relentless monitoring that in recent decades has helped clean up rivers such as the Erie and the Hudson.

But Glennon, a professor of law at the University of Arizona, finds buried in the law some further reasons for the neglect. Even now, he says, most American laws affecting groundwater do not recognize any connection between underground and surface waters, despite abundant evidence of such links. They remain rooted in 19thcentury ideas that underground flows were something so mysterious that they could not be understood, an assumption that has been translated into lax or nonexistent regulation.

In most parts of the U.S., the author points out, surface water is subject to doctrines of riparian law or prior appropriation, with water rights carefully parceled out to various claimants. Groundwater, in contrast, is most often subject to the rule of capture, which, as Glennon observes, essentially means that "the biggest pump wins," notwithstanding the impact on surface water or the aquifer itself.

To Glennon, the plight of the country's groundwater has come increasingly to represent what biologist Garrett Hardin called "the tragedy of the commons," a direct result of allowing citizens unlimited use of a common area. Among his recommendations for the future is an immediate halt to unregulated groundwater pumping. To some ears, especially those of high-plains Texas farmers, that is certain to sound like an unconscionable assault on property rights. But *Water Follies* makes the case that groundwater is something that we all should regard as very public indeed.

Douglas Jehl, a reporter for the New York Times, writes frequently on water issues for that publication.



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REVIEWS

THE EDITORS RECOMMEND

THE LOST WORLD OF THE MOA: PREHISTORIC LIFE OF NEW ZEALAND

by Trevor H. Worthy and Richard N. Holdaway. Principal photography by Rod Morris. Indiana University Press, Bloomington, Ind., 2002 (\$75)

This book is about much moa than moas. It places these extinct giant birds in the world of their curious contemporary fauna—the kiwis and tuataras, the walking worms and giant land mollusks that lived with the moas in "the land that time forgot." Now an archipelago, New Zealand was once part of the large southern continent of Gondwana. "Before the end of the age of dinosaurs, a fragment of Gondwana broke free, carrying with it a ready-made fauna," the authors write. Isolated, this fauna was protected from overland invasions by other animals and followed its own unique evolutionary path, along which birds—and even bats—became flightless. Some 80 million years later primitive forms still dominated. Sadly, most of these species were ill



prepared to face the new mammalian predators brought by humans. Worthy, a research associate at the Museum of New Zealand Te Papa Tongarewa, and Holdaway, an independent researcher who works for the New Zealand government and the University of Canterbury, have given us the definitive book on this world and its demise—more than 600 pages of scholarly, copiously illustrated, lucidly presented information.

THE BEST AMERICAN SCIENCE AND NATURE WRITING 2002 Edited by Natalie Angier. Houghton Mifflin, Boston, 2002 (\$27.50) THE BEST AMERICAN SCIENCE WRITING 2002

Edited by Matt Ridley. Ecco, New York, 2002 (\$27.50)

The two editors, both science writers, set out with the same objective: culling good science writing from U.S. magazines and newspapers published in 2002. Intriguingly, their collections have only one article in common—Sarah Blaffer Hrdy's "Mothers and Others," from *Natural History*. Good science writing is evidently plentiful. The 47 articles reproduced in the two books cover a broad range of subjects and make for edifying, even entertaining, reading.

THE PHYSICS OF HOCKEY

by Alain Haché. Johns Hopkins University Press, Baltimore, 2002 (\$24.95)

Haché brings to this informative study the perspective of a physicist (he is assistant professor of physics at the University of Moncton in New Brunswick, Canada) and amateur hockey player (goalie). He stints on neither the physics, which he presents clearly, nor



the hockey, making the reader feel like going to a game. Hockey, he says, perhaps involves more physics than any other sport. "Because it is played on ice, we need to take into account elements of thermodynamics and molecular physics. Skating makes use of a great deal of mechanics, as does shooting. Puck trajectories are influenced by air drag and ice friction, which involve fluid dynamics. And because hockey is a contact sport, the physics of collisions is also part of the game." After chapters on the ice and aspects of play, Haché considers the game as a whole and offers a betting tip: "Bet on the team that is in the middle of a losing streak (or against the team that seems to be on a roll)."

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