

Right Now

AQUIFERS ABOVE GROUND

Of Rain and the Rivers

IT WAS A DARK and stormy night. Rain fell steadily on rooftops, down gutters, along streets and sidewalks. It poured into drains, where it joined the current already rushing through the pipes beneath the streets. Invisibly, the rain water became a nasty cocktail of toxins as it flowed along.

The combination of rain and pavement—by themselves ubiquitous and seemingly harmless—has replaced illegally dumped chemicals as the pollutant *du jour* for the nation's rivers. Rainwater carries motor oil, brake-lining residue, dog feces, and other noxious substances that collect on pavement down into drains that empty directly into rivers. Rivers also suffer from pavement's impenetrable seal over the soil. If rain can't soak in, the level of subterranean ground water (which gradually replenishes rivers and streams) decreases and the likelihood of flooding during storms increases.

But pavement is here to stay. The solu-



Asphalt doesn't absorb: A Michigan suburbanite clears a storm drain to admit runoff.

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MATT GENTRY/ASSOCIATED PRESS

tion is to catch rainwater *before* it reaches the streets and storm drains. “Today’s mantra is ‘Start at the source,’” says associate professor of landscape ecology Robert France, who teaches a workshop in urban storm-water management at the Graduate School of Design. France encourages individuals, businesses, city governments, and even universities to collect storm water *early*—before it’s tainted by pavement’s poisons—and reuse it for irrigation, decorative fountains, or so-called “green roofs” (extensive—and not necessarily accessible—rooftop gardens with sufficient soil and plantings to absorb rain). “We need dispersed micromanagement [of storm water], starting with lawns, driveways, rooftops, and buildings,” he says.

Landscape engineers, who usually focus on watersheds outside residential sites, such as suburban industrial parks, customarily design detention ponds (which collect rain from sewer pipes and gradually release it into rivers) or infiltration systems (which hold water and allow it to absorb into the soil). These methods, although widespread and effective, are costly and require plenty of space. “They’re hard to do in urban settings,”

says France. He decries the prevailing “pipe-to-pond mentality” that views “storm water as a nuisance” and hinders engineers from considering more environmentally sound alternatives.

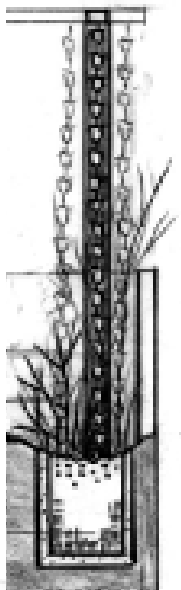
A year ago, however, two of France’s students won a national competition aimed at changing this paradigm. Sponsored by the Environmental Protection Agency and MIT, the competition challenged landscape architects and engineers to design creative, replicable, and affordable (\$10,000 or less) methods of managing storm water at a Cambridge residence located near the Charles River. The winning proposal will serve as a model that local residents can replicate.

Third-year landscape-architecture students Katherine Alberg Anderson and Gweneth Newman used gardens and rain barrels to keep storm water on the property and designed gutters and stone streambeds to direct runoff to plantings and gardens. But their proposal’s most striking feature—specifically praised by one judge—was its unusual embrace of

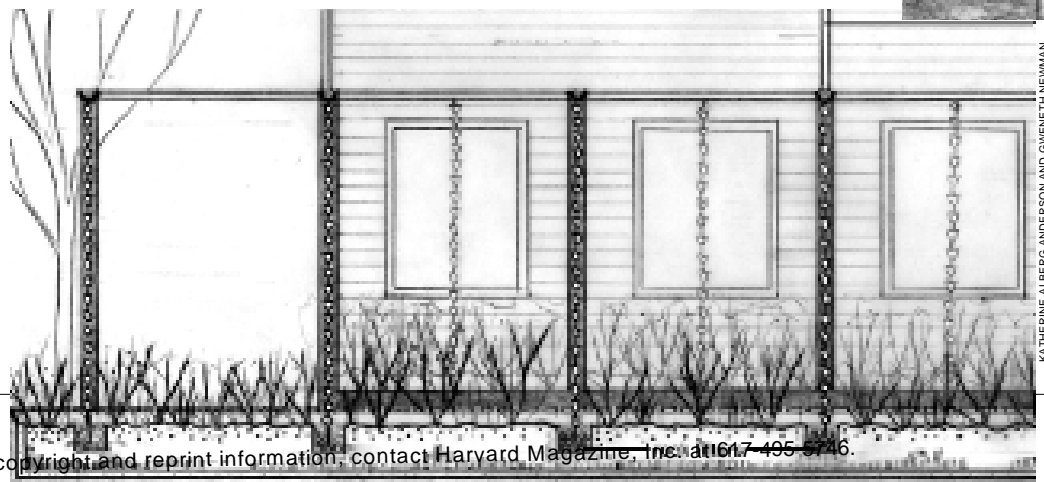
rain’s aesthetic and sensory qualities. Instead of treating storm water as an annoyance to be removed swiftly and soundlessly, Anderson and Newman celebrated rain’s soothing patter and appealing shine on stones and plants. They designed a “rain chain” pergola: a series of connected copper funnels that hang from gutters and over paths to direct runoff from the roof into gardens. As rain falls, it tinkles pleasantly against the funnels. “The rain chains drape on either side of the walkway, enhancing the sight and sound of cascading water on rainy days,” Anderson and Newman wrote in their proposal. The stone streambeds gleam during storms, but otherwise remain dry, “drawing attention to the ephemeral nature of rain.”

The design’s other features—such as barrels to collect rain to water the garden—are popular among environmentally savvy homeowners, but professionals typically neglect them. “Sustainability is generally not in the landscape architect’s toolkit,” says Anderson. “It’s not taught.” But both students envision the completed project (construction should finish by spring) as an educational tool. Because homeowners can replicate each feature separately and cheaply, they can easily customize the design for their own yards. “The designs are very

A pipe (above) carries runoff and pollutants into the Rivanna River in Virginia. The winning stormwater design’s “rain chain” of linked copper funnels (right) drips into a buried rock filter at its base. Below, a pergola has roof beams of PVC pipes, linked into a network of rain channels draining into several rain chains.



KATHERINE ALBERG ANDERSON AND GWENETH NEWMAN



durable, very do-it-yourself," Anderson explains. "We may even get the neighbors to help with the installation."

Although pleased with the competition's objectives—and his students' design—France remains discouraged by the community's general unwillingness

to embrace storm-water management strategies even as individuals readily complain about flooding. "Walk around. How many people are using rain barrels?" he asks. "Even Harvard"—with its many flat roofs and sloped lawns with drains emptying directly into the

Charles—"is a poor environmental citizen."
 ~CATHERINE DUPREE

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SIMIAN STATUS

Chimpanzees and the Law

IT'S STILL LEGAL to buy our closest living relatives as pets," declared Jane Goodall, the renowned primatologist. "You can buy them on the Internet." She spoke at a symposium on "The Evolving Legal Status of Chimpanzees" cosponsored by Harvard Law School's Student Animal Legal Defense Fund and the nonprofit Chimpanzee Collaboratory; the September conference explored legal protections (and lack of same) for the great apes, a subcategory of primates that includes chimpanzees, bonobos, gorillas, orangutans—and, according to some proponents, humans.

In fact, human and chimpanzee DNA are 98.7 percent identical, a biological fact that has supported the use of these primates in laboratory research. Goodall, however, claimed that such studies have not produced major scientific advances. "I want a new mindset," she said. "We need to recognize that animal medical research hasn't helped that much." (For a broad discussion of this issue, see "Animal Research," January-February 1999, page 48.)

Goodall's landmark study of chimpanzees in Tanzania helped redefine the boundaries between animals and humans, the very boundaries that were the symposium's focal point. The event attracted primatologists like Richard Wrangham, Moore professor of biological anthropology, who directs the Kibale Chimpanzee Project in Uganda, as well as legal figures such as Stephen Wise, who taught the first animal-rights law class at Harvard, in 2000, and Frankfurter professor of law Alan Dershowitz. Most speakers took as given that chimpanzees can communicate and emote, and that their rights should be expanded.

"This is all stuff we've known for 35 years," said Roger Fouts, professor of psychology at Central Washington University and author of *Next of Kin*, a book about his experiences while teaching American Sign Language to a chimpanzee named Washoe. "Chimps talk," he said. "Big deal. This is what they do." Gorillas talk, too; in the 1970s, a Stanford graduate student, Penny Patterson, taught sign language to a gorilla named Koko. (For Goodall, the divide between humans and other primates is slight; at one point she referred to "Washoe and Koko and people like that.") Fouts accused the eminent MIT linguist Noam Chomsky, a vocal critic of the notion that chimpanzees possess verbal communication faculties, of "pandering to human arrogance in order to sell books."

Several speakers, including Dershowitz and Goodall, compared the chimpanzees' situation with that of slaves in nineteenth-century America. Going even further, Fouts drew an analogy to Nazi Germany: "We abuse animals to make ourselves feel better, and we justify it," he said—just as Nazis justified their attacks on Jews and the mentally retarded.

Dershowitz argued that animals do not have inherent rights, but rather rights vis-à-vis people. In other words, because great apes can show that they suffer, and because people can see that they suffer, it would be humane to make laws to prevent that suffering. "You can't really make the argument that animals have the right to live," he said. "If we did, humans would have to protect the smaller animals in the jungle from the larger animals."



Politically, the great apes are making some gains. The Uniform Trust Act of 2000 allows designation of an animal as the beneficiary of a trust. About 25 U.S. universities now offer classes in animal-rights law and Oxford University Press will publish an animal-rights-law anthology, edited by Cass Sunstein '75, J.D. '78, and Martha Nussbaum, Ph.D. '75, this coming fall. Not only do federal regulations issued by the Department of Agriculture prohibit keeping chimpanzees in psychologically harmful environments, but the National Institutes of Health has announced a \$24-million, 10-year grant to fund the country's first convalescent home for chimpanzees: Chimpanzee Haven, a 200-acre site in the Louisiana rainforest, will shelter 800 chimpanzees