Water Wary?
Your backcountry H₂O may be safer than you think

Robert Rockwell wants to give you your water back. He wants to re-acquaint you with the simple joy of plunging your face into a remote backcountry stream and heedlessly gulping. Robert Rockwell wants you to believe what he believes: that if you drink smart, you run almost no risk of being infected with *Giardia*—the best known of diarrheal parasites—by drinking straight from a wilderness river.

Rockwell, a retired California biomedical engineer, has spent 15 years obsessively researching the presence—or absence—of *Giardia* in his native Sierra Nevada. His conclusions challenge 20 years’ worth of backpackers’ wilderness dogma.

Parasitic Paranoia

A teardrop-shaped organism just one two-thousandths of an inch long, *Giardia lamblia* latches onto its host’s upper intestine, where it multiplies up to a million times in a week. The parasite typically takes at least a week—and up to a month—to induce symptoms (among them severe diarrhea, bloating, cramps, and nausea, that, untreated, can last for months). As they expel from the body, the parasites morph into dormant egglike cysts that can survive for up to three months. *Giardia* is the most commonly diagnosed intestinal parasite in the United States, infecting about 2.5 million Americans a year—most of them far from the woods. Though it’s often called "backpackers’ disease," the bug’s favorite breeding grounds are actually mental institutions, day care centers, and public swimming pools.

That said, no one is suggesting that giardia isn’t a reasonably common camping-related affliction. What Rockwell is saying is that it’s a mistake to cast water as the villain. Though there are other potential dangers lurking in untreated water (the rare but vicious *Cryptosporidium parvum* among them), in the case of *Giardia*, studies consistently bear out Rockwell’s point: In one, for instance, the U.S. Geological Survey and the California Department of Health investigated the water at 69 spots along Sierra Nevada streams (42 of which they characterized as “high-use”). *Giardia* cysts were found at just 18 of the

resources

You Gotta Drink Smart

Drinking freely in the backcountry can be exhilarating, but know that the choice to do so is always a calculated risk. A few tips for safe gulping:

- Water is less likely to be contaminated during the spring (the cysts cannot survive freezing winter temperatures), and at higher elevations, where there is less human and animal traffic. The farther water has traveled, the more opportunity it has had to pick up contaminants.
- Cold water from large, fast-flowing streams is your best bet. The colder the water, the more likely it is to be freshly melted and the less likely it is to be contaminated. Given the option, drink from streams that cross the trail rather than run parallel to it.
- At a lake or pond, drink from the inlet or, your next best choice, the outlet. Beware of bodies of water in depressed, swampy areas or near heavily used campsites. Head uphill or upstream for your source.
- On extended backcountry trips, always carry an emergency water-treatment option. Iodine tablets are cheap, light, and effective against many bugs. —K.T.
sites, with the highest concentration being 0.108 cysts per liter of water; the second highest concentration was 0.037 per liter. (By comparison, consider that San Francisco tap water contains an average of 0.12 cysts per liter.) Centers for Disease Control (CDC) studies show that it takes exposure to at least ten *Giardia* cysts to have a reasonable chance of contracting the disease—which means that even at the site with the highest level of contamination, you'd need to drink about 90 liters of water to be at risk. The highest concentrations found in other wilderness areas have averaged about one per liter.

Even when cysts are highly concentrated, infection rates are low. In one case investigated by the CDC, the town of Berlin, New Hampshire, was accidentally exposed to heavily contaminated water. Of the 46 percent of citizens who tested positive for the bug's presence, less than a quarter developed symptoms. And even once symptoms appear, the situation is far from dire: Only 8 percent of Americans with symptoms like those of giardia seek medical treatment; of those who are actually infected, most are successfully cured with a single dose of antibiotics, though the bug can take a harder toll on pregnant women, infants, and those with immunodeficiencies.

Still, the question remains: If not the water, what causes backcountry cases of giardia? Consider two salient facts: (1) Up to 7 percent of the U.S. population at any given time is unknowingly infected with *Giardia*. (2) Personal hygiene is a common camping casualty. In other words, don't blame the water; blame the grungy hands of your five friends all fumbling about in the same bag of gorp.

**Warning Signs**

George Durkee, a ranger with 30 years of experience in the Sierra, says Rockwell's conclusions are no surprise. He never treats his water, and he says that almost none of the backcountry professionals he's worked with over the years do, either. Meanwhile, he regularly sees inexperienced hikers who hold on to their filters like toddlers to pacifiers. "I've run into hikers who were becoming dehydrated because they were afraid to drink the water when their filter systems broke down," Durkee says. "They were waiting to get into camp to boil water. Some groups even insist on treating their dishwashing water, they're so nervous as a result of government warnings."

In fact, it was just such dire trailhead warnings that originally inspired Rockwell—who...
The Cure for What Bites You

Inspired by technology used to protect marathon swimmers during the 2000 Olympic Games, Australian Seachange Technology created an electronic ankle band that emits an electronic field, which prevents sharks from swimming too close. The device is called the Shark Shield. It is a waterproof, rechargeable electronic device that attaches to a swimmer's ankle and creates an electric field within six feet of the swimmer. The device is designed to keep sharks away without harming them. It is believed that the electric field created by the device confuses the sharks, causing them to avoid swimmers wearing the device. The device is currently being tested and is expected to be available for sale in the near future.
has been hiking the Sierra since 1950 without ever treating his water, and without once falling ill—to investigate the evidence for himself.

Of course, the Park and Forest Services conduct a different sort of cost-benefit analysis than does the average backcountry habitué. Dennis Juranek, a specialist with the CDC’s Division of Parasitic Diseases, says that it’s possible to be infected by ingesting a single cyst—though he concedes that there are no documented cases of giardia being contracted from such low contamination levels. Juranek’s agency advises the parks in devising and revising their warnings and recommendations. The guiding philosophy: better safe than sorry. Drinking from wilderness streams, Juranek says, is like playing Russian roulette: “You may have a gun with a hundred shots instead of six shots. The chance is small, but you’re still gambling.”

Like any successful gambler, though, Rockwell takes steps to minimize his risk. Because Giardia cysts can’t survive in freezing temperatures, contamination in many areas begins fresh every spring; therefore, Rockwell is more careful in the summer and fall. He’s more inclined to drink cold—thus more recently melted—water. He tries to drink from fast-flowing streams and avoids those that run alongside trails. If he must drink from a lake, he seeks out the inlet and draws his water from there. He considers whether any nearby campsites, beaver dams, or the like may be potential sources of contamination. And if the water doesn’t look good in any way, he moves on.

In the end, Rockwell says, all he wants is for people to enjoy their water breaks as much as he does. “I see backpackers carrying three gallons of store-bought water,” he says, “passing by these beautiful, pristine streams and lakes. People going thirsty for hours . . . just because they’re afraid to drink the water.”

**TRIBUTE**

Thor Heyerdahl (1914–2002)

The adventure began in 1937 on the Polynesian island of Fatu Hiva, where a young Norwegian scientist had come with his bride for a year-long working honeymoon. There he found stone figures that reminded him of Peruvian legends of a fair-skinned king who fled west with his followers, into the Pacific, long ago.

That wasn’t how scientists said humans reached Fatu Hiva. But to Thor Heyerdahl, the logic was obvious, the evidence compelling. When potential publishers scoffed at his findings, declaring that primitive peoples couldn’t possibly have made the trip, he decided to prove them wrong by making it himself. With a crew of five and a raft built of nine balsa logs (above), Heyerdahl traveled 4,300 miles from Callao, Peru, to the Marquesas atoll, not far from Tahiti. The account of that voyage, Kon-Tiki, published in 1948, became an international sensation, selling more than 30 million copies. It didn’t persuade the scientists—few of Heyerdahl’s books did—but it launched the author on a half-century career of dangerous voyages, thrilling narratives, and bold, sweeping ideas about the past. That career ended April 18, when Heyerdahl died at the age of 87.

Whether sailing a reed boat across the Atlantic (to prove that the Egyptians could have brought their ancient wisdom to America) or exploring the mysterious sculptures of Easter Island, Heyerdahl brought an inimitable spirit to the project. In the process, he generously made our ancestors in his own admirable image: stubborn, tough, and ready for a challenge. He may never have proved that his hypothetical race of voyagers walked the Earth, but he risked his life to show that they could have. That knowledge alone, it turns out, made the world a more exciting place to live in.

---Patrick Clinton

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**ICE DRIFT**

**CAT NIPPED**

When they motored into Russian territory on April 7, Englishman Steve Brooks and Graham Stratford became the first to drive across the Bering Strait—or at least halfway across. After 50 hours of navigating ice floes in a customized, amphibious snowcat, the duo was stopped by Russian guards at the border.

**ICED TEE**

On March 21, Scotman Roger Beames traded in pair of Thinsulate and golf shoes for skis, and boots and won Greenland’s fourth annual ice Golf Championship. The professional golfer, who had never competed on ice before, was the first ever to make par on the course, a frozen fjord riddled with towering icebergs.

**TSANGPO TAMED**

On March 2, kayaker Scott Lindgren announced that his team had completed the first descent of Tibet’s Yarlung Tsangpo Gorge, long considered the Everest of white water. With a drop that is eight times that of the Colorado through the Grand Canyon, the Tsangpo has killed two kayakers since it opened to foreigners in 1992.

**SAND OF BROTHERS**

Braving Saharan sandstorms and 122°F temperatures, Moroccan brothers Lahcen and Mohamed Ahansal on April 13 claimed first- and second-place finishes, respectively, in their country’s 135-mile Marathon des Sables, a weeklong sprint considered to be one of the toughest footraces in the world.

---M.M.