



At Washington's Olympic National Seashore, Gordon Hempton adjusts mikes in dummy head he calls "Fritz."

He is recording the rumbling sounds produced by nearby driftwood as it resonates with the crashing of the surf.

By A. Richard Immel

Shhhh... those 'peculiar people' are listening

They're out there in the boondocks, doing their best to record the pure sounds of nature while there are still some quiet places left

Smithsonian 1995 April

As all good hunters do, we gather in the chill, predawn mountain air for a last-minute equipment check before fanning out into the woods. This is our second day in the field. Yesterday we combed marshes in California's Sierra Valley for waterfowl. Today, we've broken up into twos and threes to stalk the red fir forest that crowds Yuba Pass north of Lake Tahoe.

It's all over in an hour. As the sun rises, we straggle back to the clearing where the off-road vehicles and vans that brought us up here are parked. We wolf down cold pastries, guzzle hot coffee and begin telling war stories about the morning's events. We won't know for a while exactly what we've bagged, but indications are promising. "Did anyone get that barking dog?" Several heads nod.

These "hunters" are members of a little-known organization called the Nature Sounds Society. The occasion is the society's ninth annual field workshop, and the prey isn't wildlife but the sounds of wildlife. Instead of shotguns and rifles, the hunt is conducted with shotgun microphones and portable tape recorders.

In a rustic dining room at a San Francisco State

Photographs by Chad Slattery

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University field station, our home base for the weekend, we huddle around an expensive stereo sound system and showcase some of our trophies. Andy Switzer, graced by beginner's luck, plays his recording of the heated squawking of two woodpeckers scrapping over territory. It's a striking—and rare—recording, since male woodpeckers seldom get close to each other. Lyman Miller plays the exuberant howl of a young coyote, and Kelly Newman's tape erupts with the static-like crackling of ants trying to kick her microphone out of their anthill. Bill Gilbert gives us the clear, musical tones of a yellow-headed blackbird.

The remarkable thing about these recordings is not just their superb quality but the diversity of the people who made them. The Nature Sounds Society is a motley crew of artists, students, laborers, teachers, engineers, retirees and musicians with a common passion for eavesdropping on the wild. For them, as for most of us, there is magic in the roar of a mountain waterfall, the call of a loon and the croaking of pond frogs. But with their electronic ears, they hear subtle things we don't even know exist, like the muffled rustle of an owl's wings, the vibrations of driftwood on a windswept beach and the gliding movement of a snake across the ground.

Some of these sound buffs are skilled technicians and nationally recognized experts in bird identification. Others are rank newcomers whose greatest previous audio challenge came from the headphones of a Walkman. Newman is working on a master's degree in marine biology. Gilbert is nationally known for his research on the orange-crowned warbler. Miller works at Hewlett-Packard developing materials to make hard drives; on weekends he does recordings of the endangered clapper rail for a Bay Area conservation group. Retired accountants Fred and Ginny Trumbull have been record-

The author, a former Wall Street Journal reporter, writes about technology and Western lore from his California home.

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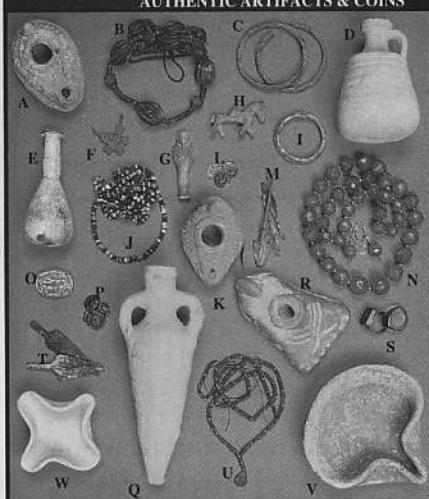
ing nature for 45 years. Their sounds of birds, coyotes and desert creatures have been used by the state of Hawaii, National Public Radio and the Arizona-Sonora Desert Museum. The society has even changed the lives of some members. Jazz musician and "sound designer" Jason Reinier and Catherine Girardeau, an audio text editor for an electronic newspaper, had their first date at Point Reyes while recording ocean sounds. They were married a year and a half later.

Paul Matzner is the godfather of the group. Curator of the California Library of Natural Sounds at the Oakland Museum, he organized the society he now affectionately calls "the peculiar people" in 1983. By then, he and a few other enthusiasts had built a small but impressive archive, and requests were beginning to come in from people who needed nature sounds for movies, educational projects and exhibits. Many of those folks were making their own recordings, as well. "They were all pioneers in the field," Matzner says, "but they didn't know that anyone else was doing the same kind of work." They needed a way to compare notes, so the Nature Sounds Society was organized. Much of its work has ended up in the Oakland Museum's sound library, which now includes recordings of everything from ants to elephant seals—more than 260 species of California fauna in all.

The society has attracted many of the nation's prominent nature recordists either as members or advisers. Bernie Krause, whose hugely popular habitat recordings are sold through the Nature Company's chain of environmental stores, is a longtime member and technical adviser. Emmy Award-winning recordist Gordon Hempton has appeared at society workshops to share his recording techniques and philosophy.

Taping nature's sounds is for many practitioners much more than just a hobby. "If we don't get this stuff now, we may never get another chance," says Greg Budney, curator of the Library of Natural Sounds at Cornell University.

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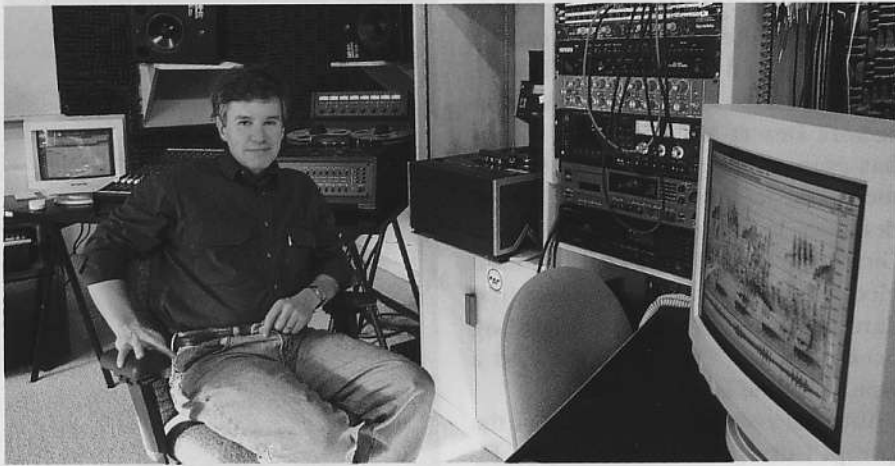
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In his lab, Bernie Krause transforms raw field recordings into "sound sculptures"; the "voiceprints" (at right) are of lemurs in Madagascar.

"It's our job to document wildlife and habitats before they disappear." Budney is doing his part. Cornell has the world's largest nature sound archive, with more than 100,000 recordings, and it's adding 5,000 more a year.

Recording of natural sounds had to await the development of equipment that could be used outdoors. The big breakthrough came in the late '50s and '60s with the introduction of relatively small open-reel and cassette tape recorders that operated on batteries. The latest revolution in recording technology is the digital audio tape (DAT) recorder, which eliminates tape hiss.

To find out how an expert records birdcalls, I recently joined Paul Matzner on a field trip. It was before dawn when Matzner emerged from his van loaded for bird: he had a tape recorder slung over his shoulder and was wearing earphones plugged into a parabolic microphone dish. Measuring two feet across, the dish thrust out from his chest like a shield. With all of that paraphernalia, Matzner looked like a walking satellite.

We were in the Sacramento National Wildlife Refuge, surrounded by thousands of wintering snow geese, white-fronted geese, Canada geese, tundra swans and sandhill cranes. "We're going to make the best recording ever made," Paul said. "That's a little joke among nature recordists. Every time we

go out, we're going to make the best recording ever made. We have to get started this early in order to avoid the birders and the hunters. When they show up, it's all over."

Matzner had spent the previous evening checking out his recording equipment and methodically taping up the metallic ends of the zippers on his clothing and equipment pouches so they wouldn't clink in the field. Avoiding extraneous noise is an obsession among wildlife recordists. I was gently chided for the swishing sound made by my sleeves every time I raised my binoculars to scan for birds.

We recorded the morning fly-out of thousands of black-and-white snow geese as they moved into the surrounding ricefields to feed, and later captured the flight of some Canada cacklers. Matzner said the recording was great—except for the sound of my handclap, which is what startled the cacklers into the air. The fact that we induced the birds to fly bothered Matzner because it interfered with their normal behavior. Provoking animals and birds to get a vocal response is considered a necessary evil among many wildlife recordists. "Most animals make a sound for one of two reasons," Matzner explained, "territorial warning or aggression. For either, you need a significant other antagonist."

A spectacular taping of a flock of

white-fronted geese honking close overhead was suddenly ruined by the blast of a train whistle blaring across the floor of the valley. "Well, there's another one for the quietude file," Matzner said, snapping off his recorder in disgust. The quietude file is his collection of tapes ruined by the intrusion of airplanes, trains, cars and people.

We left the refuge and its freeway and train noises for the quieter back roads of California's rice country. Matzner suddenly braked to a stop. On the side of the road were 300 tundra swans resting in a farmer's flooded ricefield. Even to my untrained ear, their voices were impressive. The acoustics were complex. The foreground sounds reflected off the farm buildings, while the droning of thousands of snow geese in a field behind the buildings acted as a sonic backdrop.

We climbed out of the van, and Matzner became increasingly excited as he scanned the scene through his headphones. "This is really incredible," he said. "I'm getting the swans in the foreground and the snow geese in the background. It's like a meeting of wildlife."

Matzner switched to his heavier but more dependable reel-to-reel machine. For the next hour and a half I quietly fed him reels of fresh tape, while he fought fatigue from carrying the 20-pound recorder and parabolic microphone reflector.

As we climbed into the van, Matzner was jubilant. "Incredible," he said. "This is the recording of a lifetime."

The sounds of nature are becoming a hot property. Zoos and museums now use recordings to add pizzazz to their exhibits. Some are short bursts of the cries and calls of a particular species continuously replayed in a loop. Others, like those in the Oakland Museum, are designed to re-create a sense of space and time by moving sounds among several speakers and keying them to a particular time of day, such as dawn or dusk.

Movies and television are also showing more interest in authentic wildlife

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sounds. Matzner provided sounds for the Harrison Ford film *The Mosquito Coast*, and he and Greg Budney collaborated to produce recordings for *Land of the Eagle*, a documentary on California wildlife habitats that aired on PBS.

At the consumer level, nature sound tapes and CDs are proliferating. On one end of the spectrum are educational tapes like Cornell University's *Field Guide to Bird Song*, a companion to Roger Tory Peterson's famous birding manual; at the other are various combinations of natural sound and New Age mood music designed to accompany such activities as meditating, writing and lovemaking. Some of the most popular are birdsongs and gurgling streams for meditators, flowing sounds like rain for writers, and—no surprise here—thunderstorms, ocean waves, and leaves vibrating in the rain for lovers. As for what's in between, listeners can tune in to everything from grunting elephant seals to hissing barn owls, and there's a particularly rich selection of rain forest creatures to eavesdrop on.

The nature-sound share of the record business reached \$100 million in 1994, estimates Krause, and it's expected to keep growing rapidly. Nobody has done better in this market

than Bernie Krause. His 50 CDs have sold more than a million copies, and \$300,000 of the profits has been donated to the Nature Conservancy.

Krause, who at 56 still generates the infectious enthusiasm of a man who loves his work, was trained as a musician. He replaced Pete Seeger in the Weavers folksinging group back in the '60s. He played in studio bands in New York and Los Angeles before returning to college for his PhD in creative arts and bio-acoustics. Krause worked in film sound effects, did Hollywood sound tracks, introduced the Moog synthesizer to rock groups such as the Beatles and the Rolling Stones, did "forensic" recording analysis—he worked on the Watergate tapes to make them easier to hear—and in the mid-'80s put together a tape of whale feeding sounds to lure a wayward young humpback whale out of the Sacramento Delta where it had lost its way. It was Krause, bored with synthesized sound a few years after he popularized it, who in 1968 was the first to publish a recording based on nature sounds.

Steven Feld is another musician—a jazz trombonist—who found his way into nature recording. For the past 18 years the University of Texas ethnomusicologist has been recording and studying the voices of the Kaluli, the



Veteran recordist Fred Trumbull began in 1949 with a 33-pound wire recorder. Catherine Girardeau's digital audio tape (DAT) machine weighs just 17 ounces.

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indigenous people who live in the rain forests of Papua New Guinea. In 1991 he won a \$260,000 MacArthur Foundation "genius" award. When Grateful Dead drummer Mickey Hart heard some of Feld's earlier tapes on National Public Radio in 1984, he offered to make his state-of-the-art recording and production facilities available. The result is a remarkable recording of the daily singing and work routine of the Kaluli against the background sounds of the rain forest.

"There are duets with birds and crickets, a woman singing with the water, an early evening rainstorm, the ritual sounds of drumming and ritual ceremonial singing, and then the sounds of deep night and owls," Feld says. "What is unique about the recording is the way the Kaluli mimic the sounds of the jungle and water and birds around them in their singing."

The issue of what is authentic and what isn't, is not as simple as it may seem. Most recordists agree that all taped sound, because it passes through mechanical intermediaries—microphones, magnetized tape, amplifiers and speakers—is, to some degree, artificial.

Krause explains that you can't just put a microphone on the beach and expect to get a recording of what your ears hear. "All you'll get is white noise," he says. That is acoustic jargon for sound that has no distinguishing features. "As soon as we've taped something in the field, we have to transform it into something that gives the listener an illusion of that place."

The way most acoustical artists do that is to record multiple tracks from different vantage points and then "mix" them together in the studio. One day Krause took me to the shoreline of the Marin Headlands in the shadow of the Golden Gate Bridge to show me how it works. Using two microphones mounted together on a tripod (one for wide dispersion, the other focused straight ahead) he first recorded the overall sound of the waves from about 20 feet behind the surf line. Then he moved the tripod closer to the sea to



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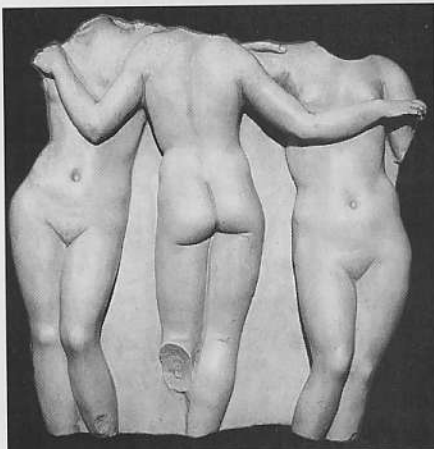
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record the sounds of the surf washing in on the sand, and then moved it still closer to record the sounds of the waves lapping around a rock.

Back in his studio, he put the tapes on his mixing machine so we could listen to them simultaneously. He deftly changed the volume until the recorded sounds were similar to what we had heard on the beach.

Paul Matzner mixes field recordings for his commercial releases, too. Steven Feld's *Voices of the Rain Forest* contains 8 tracks to create the presence of a woman singing against the background sounds of a waterfall, and Bernie Krause typically mixes 50 or 60 tracks on his jungle CDs. Just about everyone seems to agree that mixing sound is the only way to achieve the acoustic reality of nature. Everyone, that is, except Gordon Hempton.

Hempton's recording technique is unorthodox. His microphone is a plastic model of a human head that looks as if it could have been taken from a mannequin in a department store window. "Fritz," as he calls his bald, humanoid microphone holder, has flexible outer ears that are modeled after human ears and serve the same function: to funnel external sounds



Decked out in recording gear, Paul Matzner looks like a walking satellite.

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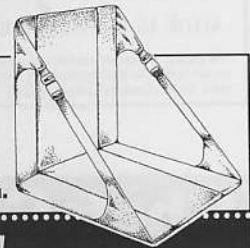
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Nature-recording sales are booming, with CD titles ranging from purist Hempton's *Dawn Chorus* to Krause's jazzy m \acute{e} lange *Gorillas in the Mix*.

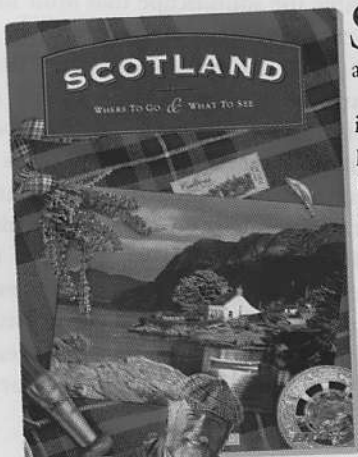
into a pair of supersensitive microphones. Hempton creates his sonic soundscapes solely by the way he positions Fritz. Once he has made a recording, Hempton does not mix the sounds. He only removes the defects caused by imperfections on the tape surface, so what Fritz "hears" is exactly what the listener hears.

Gordon Hempton brings new meaning to the word "purist." He meticulously scouts out sites for his soundscapes. He listens intently over long periods of time, a day or sometimes several days, before he sets up his microphones. Hempton is totally in touch with his environment as a listener, and he is committed to bringing what he hears to a wider audience.

Now 41, Hempton took a job as a Seattle bike messenger in 1981 to finance his early nature recordings. He claims he developed his listening skills on the streets of Seattle in order to survive in the traffic. Now he makes a living producing exquisitely delicate recordings of nature that are the envy of his peers. The Smithsonian's National Museum of Natural History selected his work to promote and sell

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5 NordicTrack has spent the last 5 years researching the patent-pending design of BackStrength which strengthens those muscles that have been weakened from a lifetime of stress and misuse.

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in the museum shops because of its authenticity. Hempton hears the music of nature in the writings of Mark Twain and John Muir and has turned these observations into recording projects; last year he and Fritz retraced Muir's 255-mile walk from San Francisco to the Yosemite Valley, re-creating where possible the soundscape that Muir himself experienced on his journey.

In 1993 Hempton won an Emmy Award for the sound portion of *The Vanishing Dawn Chorus*, a PBS documentary. He zigzagged 70,000 miles all over the globe recording the early-morning sounds of birds and animals.

Hempton is in the vanguard of the quietude movement, the effort by environmentalists and nature recordists to get out the word that places of silence are as endangered as our disappearing flora and fauna.

To those who appreciate natural sounds, man-made noise is the enemy—and it's more serious than a mere distraction. The roar of a dune-buggy engine can temporarily disable a reflexive defense of the desert kangaroo rat against one of its archenemies, the sidewinder rattlesnake. The rat normally can hear the snake at 30 inches, which gives it time to kick sand in the snake's eyes and escape. But the engine noise deafens the rat and virtually eliminates its defensive hearing zone. Until the rat's normal hearing returns, several days later, the snake often wins in an encounter.

Those who record nature sounds have quantified the loss of quiet places. Bernie Krause says there is now almost no place on Earth—including the North Pole, Antarctica and the dense forests of Indonesia and the Amazon—that is free of aircraft overflights, the buzz of chain saws and other human clatter. Krause remembers when it took 20 hours to get 15 minutes of usable recorded material. "Now it takes 200 hours," he says.

In 1984 Gordon Hempton surveyed 21 places in Washington State where he could record for 15 minutes at a stretch. Five years later, those clear



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recording times had been reduced at 18 of the sites to as little as 90 seconds.

Hempton has proposed that the National Park Service set aside one square inch in each of its parks and monuments as a noise-free area. "Who wouldn't give an inch?" he says slyly, "one square inch of peace and quiet." Hempton is well aware that such a proposal amounts to the creation of a noise-free zone many miles in circumference and extending up into space. He is now seeking funding for an acoustic survey to locate feasible one-inch sites in the ten national parks on the UNESCO World Heritage List.

Given the amount of time the recordists spend in the wilderness, most have stories to tell about narrow escapes. Bernie Krause likes to show visitors a botfly larva that was removed from his head and now resides pickled in a bottle in his studio. In 1987, when he was working at the camp of the late

primatologist Dian Fossey in Rwanda, he was surprised by a silverback gorilla that grabbed him from behind and tossed him into the bushes like a doll. His most sobering incident occurred in Tanzania when he encountered a spitting cobra on a mountain trail at chimpanzee expert Jane Goodall's research station, where he had been working. Krause hurled himself out of the way of the flying venom but cracked two ribs in the fall. "I realize my reflexes aren't as good as they were ten years ago," he says. It is one reason why he's cut his field work to three months a year.

Gordon Hempton has had his share of near misses too. He recalls a terrifying moment in the Australian outback when he had to wade—without causing so much as a ripple—past a bunch of feeding crocodiles to retrieve Fritz. He also has taped evidence of his own sixth sense kicking in to warn him of danger. When he was in Sri Lanka

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recording frogs and dripping water in the rain forest, he suddenly had an anxiety attack. He tried to rationalize the situation, but instinct won out and he took off, leaving his recorder behind. He eventually retrieved his equipment but didn't check the tape until four months later. "I heard my footsteps go away, and then I heard a leopard come out of the woods. I was being a listener, I was being a whole-body listener, and my rational mind was trying to fight it."

We must all become better listeners, Hempton believes, as do all of the "peculiar people." "I have twice tried to walk away from this endeavor because it has become too difficult, too trying emotionally, too frustrating and too expensive," confides Hempton. "But I do have hope for the future, so I just keep the tape rolling, keep my ears open, and things do happen on the positive side."

Parabolic reflectors turn Ginny Trumbull (center) and fellow Nature Sounds Society members into superlisteners, able to hear even ants kicking.

